ISSN 0253-4924

Vol. 24 No. 1

January 1989

food technology abstracts

Central Food Technological
Research Institute, Mysore,
CSIR, India.

National Information System
for Science and Technology
Department of Scientific and
ndustrial Research, New Delhi

SDI SERVICES FROM NICFOS

A few years back a survey was conducted among users of our services regarding their option for the selective dissemination of information (SDI) in the area of Food Science and Technology. The survey indicated a need for the above type of service. Recently we have started this new service with the installation of computer facility at our centre.

In SDI service we are supplying specific information needed by the users on the relevant topic of their interest based on keywords supplied by them. The SDI service is provided by searching the current tapes of the FSTA database produced by the International Food Information Service. The relevant abstracts obtained based on the profile through the computer printout will be mailed regularly. There is also scope for to alter the profile consequent to the receipt of our printout knowing the relevance or otherwise of the abstracts supplied. We are sending the printouts on trial basis for two months. If you find this service useful you can start subscription for regular SDI service.

We request you to send your profile in the prescribed form available with us

For profile form, please contact: *The Area Co-ordinator*
FOSTIS, CFTRI
MYSORE - 570 013, India.

FOR PHOTOCOPY (XEROX) OF PUBLISHED SCIENTIFIC/TECHNICAL ARTICLES PLEASE CONTACT US

The National Information Centre for Food Science and Technology (NICFOS) at the Central Food Technological Research Institute, Mysore, has got a good collection of scientific and other periodicals collected over the years in the area of Biological Sciences. If any article is needed for reference work, we will supply one copy from our wealth of collections. The cost of providing the copies is Rs.2/- per page (minimum charge Rs.10.00). Please take advantage of this facility to overcome your problem in getting original articles.

Please contact : *The Area Co-ordinator*
Food Science and Technology Information Service
C.F.T.R.I., Mysore 570 013, India.

CONTENTS

Page No

01. General ... 1
02. Food Processing ... –
03. Food Packaging ... 1
04. Food Engineering and Equipment ... 3
05. Energy in Food Processing ... –
06. Food Chemistry and Analysis ... 4
07. Food Microbiology and Hygiene ... 5
08. Biotechnology ... 12
09. Tissue Culture ... 12
10. Food Additives ... 12
11. Cereals ... 15
12. Millets ... 18
13. Pulses ... 19
14. Oilseeds and Nuts ... 21
15. Tubers and Vegetables ... 23
16. Fruits ... 28
17. Confectionery, Starch and Sugar ... 30
18. Bakery Products ... 32
19. Milk and Dairy Products ... 32
20. Meat and Poultry ... 47
21. Seafoods ... 55
22. Protein Foods ... 60
23. Alcoholic and Non-alcoholic Beverages ... 60
24. Fats and Oils ... 63
25. Spices and Condiments ... 66
26. Sensory Evaluation ... 66
27. Food Storage ... –
28. Infestation Control and Pesticides ... 67
29. Biochemistry and Nutrition ... 67
30. Toxicology ... 69
31. Food Laws and Regulations ... 70

Index

For xerox copies of articles included in this publication and also for translation service

Please write to:

Head, Food Science and Technology Information Service (FOSTIS),
CFTRI Mysore — 570 013, India.

ABBREVIATIONS

A	ampere
AAS	atomic absorption spectrometry
abstr.	abstract
ad lib.	ad libitum
ADP	adenosine diphosphate
Anon.	Anonymous
AOAC	Association of Official Analytical Chemists
approx.	approximately
atm	atmosphere
ATP	adenosine triphosphate
a_w	water activity
BHA	butylated hydroxyanisole
BHT	butylated hydroxytoluene
BOD	biological oxygen demand
b.p.	boiling point
Btu	British thermal unit
c-	centi- (as in cm, cm^2, cm^3)
cal	calorie
cd	candela
Ci	curie
CMC	carboxymethyl cellulose
COD	chemical oxygen demand
coeff.	coefficient
conc.	concentrated
concn.	concentration
cv.	cultivar
cwt	hundredweight
d-	deci-
DE	dextrose equivalent
detn.	determination
DFD	dark firm dry
diam.	diameter
dil.	dilute
DM	dry matter, Deutsche Mark
DNA	deoxyribonucleic acid(s)
dyn	dyne
E.	East, Eastern, etc.
ECD.	electron capture detection
EDTA	ethylenediaminetetraacetic acid
Eh	oxidation-reduction potential
ELISA	enzyme-linked immuno-sorbent assay
f-	femto- (10^{-15}, as in fCi)
°F	degree Fahrenheit
FAO	Food and Agricultural Organization
FDA	Food and Drug Administration
FID	flame ionization detection
fl oz	fluid ounce
f.p.	freezing point
ft	foot, feet

g	gram
GC	gas chromatography
g_n	gravity
gal	gallon
gf	gram-force
GLC	gas-liquid chromatography
h	hour
ha	hectare
HDPE	high density polyethylene
hl	hectolitre (100 l)
hp	horse power
HPLC	high performance/pressure liquid chromatography
HTST	high temperature short time
Hz	hertz (frequency cycles/s)
in	inch
IR	infrared
IU	international unit
J	joule
k-	kilo- (as in kcal, kg)
K	Kelvin
l	litre
lb	pound
lbf	pound-force
LDPE	low density polyethylene
m-	milli- (as in mg, ml, mm)
m-equiv	milli-equivalent
ᴍ	molar concentration
M-	mega- (as in Mrad)
max.	maximum
min	minute (time)
min.	minimum
mol	mole
mol.wt.	molecular weight
m.p.	melting point
MPN	most probable number
MS	mass-spectrometry
n-	nano- (10^{-9}, as in nm)
N	Newton (kg m/s^2)
N.	North, Northern, etc.
	normal concentration
NMR	nuclear magnetic resonance
NPU	net protein utilization
oz	ounce
p-	pico- (10^{-12}, as in pCi)
P	Poise
P	probability
Pa	Pascal (N/m^2)
PAGE	polyacrylamide gel electrophoresis
PER	protein efficiency ratio
p.p.b.	parts per billion
p.p.m.	parts per million
PSE	pale soft exudative
PTFE	polytetrafluorethylene
PVC	polyvinyl chloride
PVDC	polyvinylidene chloride
qt	quart
R	rontgen
rad	rad or radian
ref.	reference(s)

rev/min	revolutions per minute
RH	relative humidity
RNA	ribonucleic acid(s)
S.	South, Southern, etc.
s.d.	standard deviation
SDS	sodium dodecylsulphate
s.e.	standard error
s	second (time)
SNF	solids-not-fat
sp., spp.	species
sp.gr.	specific gravity
summ.	summary
Suppl.	Supplement
t	metric tonne
temp.	temperature
TLC	thin layer chromatography
TS	total solids
UHT	ultra-high temperature
UV	ultraviolet
V	volt
var.	variety
vol.	volume
v/v	volume/volume
W	watt
W.	West, Western, etc.
WHO	World Health Organization
w/v	weight/volume
wk	week
wt.	weight
yd	yard
yr	year
μ	micro- (as in μg, μm)
%	per centum
>	greater than
≥	greater than or equal to; not less than
<	less than
≤	less than or equal to; not greater than

Chemical symbols are used for elements.

ABBREVIATIONS FOR LANGUAGES

	Language of text
Dutch	Nl
French	Fr
German	De
Italian	It
Japanese	Ja
Norwegian	No
Spanish	Es
Swedish	Sv

CONTENTS

		Page No
01.	General	... 71
02.	Food Processing	... –
03.	Food Packaging	... 71
04.	Food Engineering and Equipment	... 72
05.	Energy in Food Processing	... –
06.	Food Chemistry and Analysis	... 73
07.	Food Microbiology and Hygiene	... 76
08.	Biotechnology	... 85
09.	Tissue Culture	... –
10.	Food Additives	... 87
11.	Cereals	... 88
12.	Millets	... 92
13.	Pulses	... 94
14.	Oilseeds and Nuts	... 95
15.	Tubers and Vegetables	... 102
16.	Fruits	... 107
17.	Confectionery, Starch and Sugar	... 110
18.	Bakery Products	... 111
19.	Milk and Dairy Products	... 112
20.	Meat and Poultry	... 118
21.	Seafoods	... 124
22.	Protein Foods	... 131
23.	Alcoholic and Non-alcoholic Beverages	... 132
24.	Fats and Oils	... 136
25.	Spices and Condiments	... 139
26.	Sensory Evaluation	... –
27.	Food Storage	... –
28.	Infestation Control and Pesticides	... –
29.	Biochemistry and Nutrition	... 141
30.	Toxicology	... 146
31.	Food Laws and Regulations	... –

Index

For xerox copies of articles included in this publication and also for translation service

Please write to:

Head, Food Science and Technology Information Service (FOSTIS),
CFTRI Mysore — 570 013, India.

ABBREVIATIONS

A	ampere
AAS	atomic absorption spectrometry
abstr.	abstract
ad lib.	ad libitum
ADP	adenosine diphosphate
Anon.	Anonymous
AOAC	Association of Official Analytical Chemists
approx.	approximately
atm	atmosphere
ATP	adenosine triphosphate
a_w	water activity
BHA	butylated hydroxyanisole
BHT	butylated hydroxytoluene
BOD	biological oxygen demand
b.p.	boiling point
Btu	British thermal unit
c-	centi- (as in cm,cm^2, cm^3)
cal	calorie
cd	candela
Ci	curie
CMC	carboxymethyl cellulose
COD	chemical oxygen demand
coeff.	coefficient
conc.	concentrated
concn.	concentration
cv.	cultivar
cwt	hundredweight
d-	deci-
DE	dextrose equivalent
detn.	determination
DFD	dark firm dry
diam.	diameter
dil.	dilute
DM	dry matter, Deutsche Mark
DNA	deoxyribonucleic acid(s)
dyn	dyne
E.	East, Eastern, etc.
ECD.	electron capture detection
EDTA	ethylenediaminetetraacetic acid
Eh	oxidation-reduction potential
ELISA	enzyme-linked immuno-sorbent assay
f-	femto- (10^{-15}, as in fCi)
°F	degree Fahrenheit
FAO	Food and Agricultural Organization
FDA	Food and Drug Administration
FID	flame ionization detection
fl oz	fluid ounce
f.p.	freezing point
ft	foot, feet
g	gram
GC	gas chromatography
g_n	gravity
gal	gallon
gf	gram-force
GLC	gas-liquid chromatography
h	hour
ha	hectare
HDPE	high density polyethylene
hl	hectolitre (100 l)
hp	horse power
HPLC	high performance/ pressure liquid chromatography
HTST	high temperature short time
Hz	hertz (frequency cycles/s)
in	inch
IR	infrared
IU	international unit
J	joule
k-	kilo- (as in kcal,kg)
K	Kelvin
l	litre
lb	pound
lbf	pound-force
LDPE	low density polyethylene
m-	milli- (as in mg,ml,mm)
m-equiv	milli-equivalent
M	molar concentration
M-	mega- (as in Mrad)
max.	maximum
min	minute (time)
min.	minimum
mol	mole
mol.wt.	molecular weight
m.p.	melting point
MPN	most probable number
MS	mass-spectrometry
n-	nano-(10^{-9}, as in nm)
N	Newton (kg m/s^2)
N.	North, Northern, etc.
	normal concentration
NMR	nuclear magnetic resonance
NPU	net protein utilization
oz	ounce
p-	pico- (10^{-12}, as in pCi)
P	Poise
P	probability
Pa	Pascal (N/m^2)
PAGE	polyacrylamide gel electrophoresis
PER	protein efficiency ratio
p.p.b.	parts per billion
p.p.m.	parts per million
PSE	pale soft exudative
PTFE	polytetrafluorethylene
PVC	polyvinyl chloride
PVDC	polyvinylidene chloride
qt	quart
R	rontgen
rad	rad or radian
ref.	reference(s)
rev/min	revolutions per minute
RH	relative humidity
RNA	ribonucleic acid(s)
S.	South, Southern, etc.
s.d.	standard deviation
SDS	sodium dodecylsulphate
s.e.	standard error
s	second (time)
SNF	solids-not-fat
sp.,spp.	species
sp.gr.	specific gravity
summ.	summary
Suppl.	Supplement
t	metric tonne
temp.	temperature
TLC	thin layer chromatography
TS	total solids
UHT	ultra-high temperature
UV	ultraviolet
V	volt
var.	variety
vol.	volume
v/v	volume/volume
W	watt
W.	West, Western, etc.
WHO	World Health Organization
w/v	weight/volume
wk	week
wt.	weight
yd	yard
yr	year
µ	micro-(as in µg, µm)
%	per centum
>	greater than
⩾	greater than or equal to; not less than
<	less than
⩽	less than or equal to; not greater than

Chemical symbols are used for all elements.

ABBREVIATIONS FOR LANGUAGES

	Language of text
Dutch	Nl
French	Fr
German	De
Italian	It
Japanese	Ja
Norwegian	No
Spanish	Es
Swedish	Sv

CONTENTS

		Page No
01.	General	... 149
02.	Food Processing	... 150
03.	Food Packaging	... 151
04.	Food Engineering and Equipment	... 152
05.	Energy in Food Processing	... –
06.	Food Chemistry and Analysis	... 154
07.	Food Microbiology and Hygiene	... 155
08.	Biotechnology	... 161
09.	Tissue Culture	... –
10.	Food Additives	... 161
11.	Cereals	... 164
12.	Millets	... 170
13.	Pulses	... 172
14.	Oilseeds and Nuts	... 174
15.	Tubers and Vegetables	... 177
16.	Fruits	... 186
17.	Confectionery, Starch and Sugar	... 191
18.	Bakery Products	... 193
19.	Milk and Dairy Products	... 194
20.	Meat and Poultry	... 199
21.	Seafoods	... 205
22.	Protein Foods	... 218
23.	Alcoholic and Non-alcoholic Beverages	... 218
24.	Fats and Oils	... 221
25.	Spices and Condiments	... 224
26.	Sensory Evaluation	... 227
27.	Food Storage	... 228
28.	Infestation Control and Pesticides	... –
29.	Biochemistry and Nutrition	... 229
30.	Toxicology	... 229
31.	Food Laws and Regulations	... 231
	Index	

For xerox copies of articles included in this publication and also for translation service

Please write to:

Head, Food Science and Technology Information Service (FOSTIS),
CFTRI Mysore — 570 013, India.

ABBREVIATIONS

A	ampere
AAS	atomic absorption spectrometry
abstr.	abstract
ad lib.	ad libitum
ADP	adenosine diphosphate
Anon.	Anonymous
AOAC	Association of Official Analytical Chemists
approx.	approximately
atm	atmosphere
ATP	adenosine triphosphate
a_w	water activity
BHA	butylated hydroxyanisole
BHT	butylated hydroxytoluene
BOD	biological oxygen demand
b.p.	boiling point
Btu	British thermal unit
c-	centi- (as in cm, cm^2, cm^3)
cal	calorie
cd	candela
Ci	curie
CMC	carboxymethyl cellulose
COD	chemical oxygen demand
coeff.	coefficient
conc.	concentrated
concn.	concentration
cv.	cultivar
cwt	hundredweight
d-	deci-
DE	dextrose equivalent
detn.	determination
DFD	dark firm dry
diam.	diameter
dil.	dilute
DM	dry matter, Deutsche Mark
DNA	deoxyribonucleic acid(s)
dyn	dyne
E.	East, Eastern, etc.
ECD.	electron capture detection
EDTA	ethylenediaminetetraacetic acid
Eh	oxidation-reduction potential
ELISA	enzyme-linked immunosorbent assay
f-	femto- (10^{-15}, as in fCi)
^{o}F	degree Fahrenheit
FAO	Food and Agricultural Organization
FDA	Food and Drug Administration
FID	flame ionization detection
fl oz	fluid ounce
f.p.	freezing point
ft	foot, feet
g	gram
GC	gas chromatography
g_n	gravity
gal	gallon
gf	gram-force
GLC	gas-liquid chromatography
h	hour
ha	hectare
HDPE	high density polyethylene
hl	hectolitre (100 l)
hp	horse power
HPLC	high performance/pressure liquid chromatography
HTST	high temperature short time
Hz	hertz (frequency cycles/s)
in	inch
IR	infrared
IU	international unit
J	joule
k-	kilo- (as in kcal,kg)
K	Kelvin
l	litre
lb	pound
lbf	pound-force
LDPE	low density polyethylene
m-	milli- (as in mg,ml,mm)
m-equiv	milli-equivalent
$\mathcal{M}$	molar concentration
M-	mega- (as in Mrad)
max.	maximum
min	minute (time)
min.	minimum
mol	mole
mol.wt.	molecular weight
m.p.	melting point
MPN	most probable number
MS	mass-spectrometry
n-	nano-(10^{-9}, as in nm)
N	Newton (kg m/s^2)
N.	North, Northern, etc.
	normal concentration
NMR	nuclear magnetic resonance
NPU	net protein utilization
oz	ounce
p-	pico- (10^{-12}, as in pCi)
P	Poise
$\mathcal{P}$	probability
Pa	Pascal (N/m^2)
PAGE	polyacrylamide gel electrophoresis
PER	protein efficiency ratio
p.p.b.	parts per billion
p.p.m.	parts per million
PSE	pale soft exudative
PTFE	polytetrafluorethylene
PVC	polyvinyl chloride
PVDC	polyvinylidene chloride
qt	quart
R	rontgen
rad	rad or radian
ref.	reference(s)
rev/min	revolutions per minute
RH	relative humidity
RNA	ribonucleic acid(s)
S.	South, Southern, etc.
s.d.	standard deviation
SDS	sodium dodecylsulphate
s.e.	standard error
s	second (time)
SNF	solids-not-fat
sp.,spp.	species
sp.gr.	specific gravity
summ.	summary
Suppl.	Supplement
t	metric tonne
temp.	temperature
TLC	thin layer chromatography
TS	total solids
UHT	ultra-high temperature
UV	ultraviolet
V	volt
var.	variety
vol.	volume
v/v	volume/volume
W	watt
W.	West, Western, etc.
WHO	World Health Organization
w/v	weight/volume
wk	week
wt.	weight
yd	yard
yr	year
μ	micro-(as in μg, μm)
%	per centum
>	greater than
≥	greater than or equal to; not less than
<	less than
≤	less than or equal to; not greater than

Chemical symbols are used for a elements.

ABBREVIATIONS FOR LANGUAGES

	Language of text
Dutch	Nl
French	Fr
German	De
Italian	It
Japanese	Ja
Norwegian	No
Spanish	Es
Swedish	Sv

CONTENTS

Page No

01. General ... 233
02. Food Processing ... –
03. Food Packaging ... 234
04. Food Engineering and Equipment ... 234
05. Energy in Food Processing ... –
06. Food Chemistry and Analysis ... 235
07. Food Microbiology and Hygiene ... 237
08. Biotechnology ... 240
09. Tissue Culture ... 241
10. Food Additives ... 242
11. Cereals ... 243
12. Millets ... 247
13. Pulses ... 249
14. Oilseeds and Nuts ... 253
15. Tubers and Vegetables ... 256
16. Fruits ... 263
17. Confectionery, Starch and Sugar ... 270
18. Bakery Products ... 273
19. Milk and Dairy Products ... 274
20. Meat and Poultry ... 283
21. Seafoods ... 287
22. Protein Foods ... 297
23. Alcoholic and Non-alcoholic Beverages ... 297
24. Fats and Oils ... 301
25. Spices and Condiments ... 305
26. Sensory Evaluation ... 306
27. Food Storage ... –
28. Infestation Control and Pesticides ... 306
29. Biochemistry and Nutrition ... 308
30. Toxicology ... 310
31. Food Laws and Regulations ... 311

Index

For xerox copies of articles included in this publication and also for translation service

Please write to:

Head, Food Science and Technology Information Service (FOSTIS),
CFTRI Mysore — 570 013, India.

ABBREVIATIONS

A	ampere
AAS	atomic absorption spectrometry
abstr.	abstract
ad lib.	ad libitum
ADP	adenosine diphosphate
Anon.	Anonymous
AOAC	Association of Official Analytical Chemists
approx.	approximately
atm	atmosphere
ATP	adenosine triphosphate
a_w	water activity
BHA	butylated hydroxyanisole
BHT	butylated hydroxytoluene
BOD	biological oxygen demand
b.p.	boiling point
Btu	British thermal unit
c-	centi- (as in cm,cm^2, cm^3)
cal	calorie
cd	candela
Ci	curie
CMC	carboxymethyl cellulose
COD	chemical oxygen demand
coeff.	coefficient
conc.	concentrated
concn.	concentration
cv.	cultivar
cwt	hundredweight
d-	deci-
DE	dextrose equivalent
detn.	determination
DFD	dark firm dry
diam.	diameter
dil.	dilute
DM	dry matter, Deutsche Mark
DNA	deoxyribonucleic acid(s)
dyn	dyne
E.	East, Eastern, etc.
ECD.	electron capture detection
EDTA	ethylenediaminetetraacetic acid
Eh	oxidation-reduction potential
ELISA	enzyme-linked immunosorbent assay
f-	femto- (10^{-15}, as in fCi)
°F	degree Fahrenheit
FAO	Food and Agricultural Organization
FDA	Food and Drug Administration
FID	flame ionization detection
fl oz	fluid ounce
f.p.	freezing point
ft	foot, feet
g	gram
GC	gas chromatography
g_n	gravity
gal	gallon
gf	gram-force
GLC	gas-liquid chromatography
h	hour
ha	hectare
HDPE	high density polyethylene
hl	hectolitre (100 l)
hp	horse power
HPLC	high performance/ pressure liquid chromatography
HTST	high temperature short time
Hz	hertz (frequency cycles/s)
in	inch
IR	infrared
IU	international unit
J	joule
k-	kilo- (as in kcal,kg)
K	Kelvin
l	litre
lb	pound
lbf	pound-force
LDPE	low density polyethylene
m-	milli- (as in mg,ml,mm)
m-equiv	milli-equivalent
M	molar concentration
M-	mega- (as in Mrad)
max.	maximum
min	minute (time)
min.	minimum
mol	mole
mol.wt.	molecular weight
m.p.	melting point
MPN	most probable number
MS	mass-spectrometry
n-	nano-(10^{-9}, as in nm)
N	Newton (kg m/s^2)
N.	North, Northern, etc.
	normal concentration
NMR	nuclear magnetic resonance
NPU	net protein utilization
oz	ounce
p-	pico- (10^{-12}, as in pCi)
P	Poise
P	probability
Pa	Pascal (N/m^2)
PAGE	polyacrylamide gel electrophoresis
PER	protein efficiency ratio
p.p.b.	parts per billion
p.p.m.	parts per million
PSE	pale soft exudative
PTFE	polytetrafluorethylene
PVC	polyvinyl chloride
PVDC	polyvinylidene chloride
qt	quart
R	rontgen
rad	rad or radian
ref.	reference(s)
rev/min	revolutions per minute
RH	relative humidity
RNA	ribonucleic acid(s)
S.	South, Southern, etc.
s.d.	standard deviation
SDS	sodium dodecylsulphate
s.e.	standard error
s	second (time)
SNF	solids-not-fat
sp.,spp.	species
sp.gr.	specific gravity
summ.	summary
Suppl.	Supplement
t	metric tonne
temp.	temperature
TLC	thin layer chromatography
TS	total solids
UHT	ultra-high temperature
UV	ultraviolet
V	volt
var.	variety
vol.	volume
v/v	volume/volume
W	watt
W.	West, Western, etc.
WHO	World Health Organization
w/v	weight/volume
wk	week
wt.	weight
yd	yard
yr	year
μ	micro-(as in μg, μm)
%	per centum
>	greater than
⩾	greater than or equal to; not less than
<	less than
⩽	less than or equal to; not greater than

Chemical symbols are used for al elements.

ABBREVIATIONS FOR LANGUAGES

	Language of text
Dutch	Nl
French	Fr
German	De
Italian	It
Japanese	Ja
Norwegian	No
Spanish	Es
Swedish	Sv

CONTENTS

Page No
01. General ... 313
02. Food Processing ... 313
03. Food Packaging ... 314
04. Food Engineering and Equipment ... 316
05. Energy in Food Processing ... -
06. Food Chemistry and Analysis ... 317
07. Food Microbiology and Hygiene ... 319
08. Biotechnology ... -
09. Tissue Culture ... -
10. Food Additives ... 325
11. Cereals ... 326
12. Millets ... 328
13. Pulses ... 330
14. Oilseeds and Nuts ... 335
15. Tubers and Vegetables ... 340
16. Fruits ... 345
17. Confectionery, Starch and Sugar ... 354
18. Bakery Products ... 356
19. Milk and Dairy Products ... 359
20. Meat and Poultry ... 366
21. Seafoods ... 372
22. Protein Foods ... 379
23. Alcoholic and Non-alcoholic Beverages ... 379
24. Fats and Oils ... 385
25. Spices and Condiments ... 393
26. Sensory Evaluation ... 394
27. Food Storage ... 394
28. Infestation Control and Pesticides ... 394
29. Biochemistry and Nutrition ... 395
30. Toxicology ... 396
31. Food Laws and Regulations ... 396

Index

For xerox copies of articles included in this publication and also for translation service

Please write to:

Head, Food Science and Technology Information Service (FOSTIS),
CFTRI Mysore — 570 013, India.

ABBREVIATIONS

A	ampere
AAS	atomic absorption spectrometry
abstr.	abstract
ad lib.	ad libitum
ADP	adenosine diphosphate
Anon.	Anonymous
AOAC	Association of Official Analytical Chemists
approx.	approximately
atm	atmosphere
ATP	adenosine triphosphate
a_w	water activity
BHA	butylated hydroxyanisole
BHT	butylated hydroxytoluene
BOD	biological oxygen demand
b.p.	boiling point
Btu	British thermal unit
c-	centi- (as in cm,cm^2, cm^3)
cal	calorie
cd	candela
Ci	curie
CMC	carboxymethyl cellulose
COD	chemical oxygen demand
coeff.	coefficient
conc.	concentrated
concn.	concentration
cv.	cultivar
cwt	hundredweight
d-	deci-
DE	dextrose equivalent
detn.	determination
DFD	dark firm dry
diam.	diameter
dil.	dilute
DM	dry matter, Deutsche Mark
DNA	deoxyribonucleic acid(s)
dyn	dyne
E.	East, Eastern, etc.
ECD.	electron capture detection
EDTA	ethylenediaminetetraacetic acid
Eh	oxidation-reduction potential
ELISA	enzyme-linked immunosorbent assay
f-	femto- (10^{-15}, as in fCi)
°F	degree Fahrenheit
FAO	Food and Agricultural Organization
FDA	Food and Drug Administration
FID	flame ionization detection
fl oz	fluid ounce
f.p.	freezing point
ft	foot, feet
g	gram
GC	gas chromatography
g_n	gravity
gal	gallon
gf	gram-force
GLC	gas-liquid chromatography
h	hour
ha	hectare
HDPE	high density polyethylene
hl	hectolitre (100 l)
hp	horse power
HPLC	high performance/ pressure liquid chromatography
HTST	high temperature short time
Hz	hertz (frequency cycles/s)
in	inch
IR	infrared
IU	international unit
J	joule
k-	kilo- (as in kcal,kg)
K	Kelvin
l	litre
lb	pound
lbf	pound-force
LDPE	low density polyethylene
m-	milli- (as in mg,ml,mm)
m-equiv	milli-equivalent
$\mathcal{M}$	molar concentration
M-	mega- (as in Mrad)
max.	maximum
min	minute (time)
min.	minimum
mol	mole
mol.wt.	molecular weight
m.p.	melting point
MPN	most probable number
MS	mass-spectrometry
n-	nano-(10^{-9}, as in nm)
N	Newton (kg m/s^2)
N.	North, Northern, etc. normal concentration
NMR	nuclear magnetic resonance
NPU	net protein utilization
oz	ounce
p-	pico- (10^{-12}, as in pCi)
P	Poise
P	probability
Pa	Pascal (N/m^2)
PAGE	polyacrylamide gel electrophoresis
PER	protein efficiency ratio
p.p.b.	parts per billion
p.p.m.	parts per million
PSE	pale soft exudative
PTFE	polytetrafluorethylene
PVC	polyvinyl chloride
PVDC	polyvinylidene chloride
qt	quart
R	rontgen
rad	rad or radian
ref.	reference(s)
rev/min	revolutions per minute
RH	relative humidity
RNA	ribonucleic acid(s)
S.	South, Southern, etc.
s.d.	standard deviation
SDS	sodium dodecylsulphate
s.e.	standard error
s	second (time)
SNF	solids-not-fat
sp.,spp.	species
sp.gr.	specific gravity
summ.	summary
Suppl.	Supplement
t	metric tonne
temp.	temperature
TLC	thin layer chromatography
TS	total solids
UHT	ultra-high temperature
UV	ultraviolet
V	volt
var.	variety
vol.	volume
v/v	volume/volume
W	watt
W.	West, Western, etc.
WHO	World Health Organization
w/v	weight/volume
wk	week
wt.	weight
yd	yard
yr	year
µ	micro-(as in µg, µm)
%	per centum
>	greater than
⩾	greater than or equal to; not less than
<	less than
⩽	less than or equal to; not greater than

Chemical symbols are used for all elements.

ABBREVIATIONS FOR LANGUAGES

	Language of text
Dutch	Nl
French	Fr
German	De
Italian	It
Japanese	Ja
Norwegian	No
Spanish	Es
Swedish	Sv

CONTENTS

Page No

01. General ... 397
02. Food Processing ... –
03. Food Packaging ... 397
04. Food Engineering and Equipment ... 398
05. Energy in Food Processing ... 399
06. Food Chemistry and Analysis ... 399
07. Food Microbiology and Hygiene ... 400
08. Biotechnology ... 404
09. Tissue Culture ... –
10. Food Additives ... 404
11. Cereals ... 406
12. Millets ... 410
13. Pulses ... 414
14. Oilseeds and Nuts ... 418
15. Tubers and Vegetables ... 421
16. Fruits ... 426
17. Confectionery, Starch and Sugar ... 432
18. Bakery Products ... 435
19. Milk and Dairy Products ... 438
20. Meat and Poultry ... 445
21. Seafoods ... 452
22. Protein Foods ... 458
23. Alcoholic and Non-alcoholic Beverages ... 459
24. Fats and Oils ... 463
25. Spices and Condiments ... 466
26. Sensory Evaluation ... 467
27. Food Storage ... –
28. Infestation Control and Pesticides ... 469
29. Biochemistry and Nutrition ... 470
30. Toxicology ... 473
31. Food Laws and Regulations ... 473

Index

For xerox copies of articles included in this publication and also for translation service

Please write to:

Head, Food Science and Technology Information Service (FOSTIS),
CFTRI Mysore — 570 013, India.

ABBREVIATIONS

A	ampere
AAS	atomic absorption spectrometry
abstr.	abstract
ad lib.	ad libitum
ADP	adenosine diphosphate
Anon.	Anonymous
AOAC	Association of Official Analytical Chemists
approx.	approximately
atm	atmosphere
ATP	adenosine triphosphate
a_w	water activity
BHA	butylated hydroxyanisole
BHT	butylated hydroxytoluene
BOD	biological oxygen demand
b.p.	boiling point
Btu	British thermal unit
c-	centi- (as in cm, cm^2, cm^3)
cal	calorie
cd	candela
Ci	curie
CMC	carboxymethyl cellulose
COD	chemical oxygen demand
coeff.	coefficient
conc.	concentrated
concn.	concentration
cv.	cultivar
cwt	hundredweight
d-	deci-
DE	dextrose equivalent
detn.	determination
DFD	dark firm dry
diam.	diameter
dil.	dilute
DM	dry matter, Deutsche Mark
DNA	deoxyribonucleic acid(s)
dyn	dyne
E.	East, Eastern, etc.
ECD.	electron capture detection
EDTA	ethylenediaminetetraacetic acid
Eh	oxidation-reduction potential
ELISA	enzyme-linked immuno-sorbent assay
f-	femto- (10^{-15}, as in fCi)
°F	degree Fahrenheit
FAO	Food and Agricultural Organization
FDA	Food and Drug Administration
FID	flame ionization detection
fl oz	fluid ounce
f.p.	freezing point
ft	foot, feet
g	gram
GC	gas chromatography
g_n	gravity
gal	gallon
gf	gram-force
GLC	gas-liquid chromatography
h	hour
ha	hectare
HDPE	high density polyethylene
hl	hectolitre (100 l)
hp	horse power
HPLC	high performance/ pressure liquid chromatography
HTST	high temperature short time
Hz	hertz (frequency cycles/s)
in	inch
IR	infrared
IU	international unit
J	joule
k-	kilo- (as in kcal, kg)
K	Kelvin
l	litre
lb	pound
lbf	pound-force
LDPE	low density polyethylene
m-	milli- (as in mg, ml, mm)
m-equiv	milli-equivalent
M	molar concentration
M-	mega- (as in Mrad)
max.	maximum
min	minute (time)
min.	minimum
mol	mole
mol.wt.	molecular weight
m.p.	melting point
MPN	most probable number
MS	mass-spectrometry
n-	nano- (10^{-9}, as in nm)
N	Newton (kg m/s^2)
N.	North, Northern, etc.
	normal concentration
NMR	nuclear magnetic resonance
NPU	net protein utilization
oz	ounce
p-	pico- (10^{-12}, as in pCi)
P	Poise
P	probability
Pa	Pascal (N/m^2)
PAGE	polyacrylamide gel electrophoresis
PER	protein efficiency ratio
p.p.b.	parts per billion
p.p.m.	parts per million
PSE	pale soft exudative
PTFE	polytetrafluorethylene
PVC	polyvinyl chloride
PVDC	polyvinylidene chloride
qt	quart
R	rontgen
rad	rad or radian
ref.	reference(s)
rev/min	revolutions per minute
RH	relative humidity
RNA	ribonucleic acid(s)
S.	South, Southern, etc.
s.d.	standard deviation
SDS	sodium dodecylsulphate
s.e.	standard error
s	second (time)
SNF	solids-not-fat
sp., spp.	species
sp.gr.	specific gravity
summ.	summary
Suppl.	Supplement
t	metric tonne
temp.	temperature
TLC	thin layer chromatography
TS	total solids
UHT	ultra-high temperature
UV	ultraviolet
V	volt
var.	variety
vol.	volume
v/v	volume/volume
W	watt
W.	West, Western, etc.
WHO	World Health Organization
w/v	weight/volume
wk	week
wt.	weight
yd	yard
yr	year
μ	micro- (as in μg, μm)
%	per centum
>	greater than
⩾	greater than or equal to; not less than
<	less than
⩽	less than or equal to; not greater than

Chemical symbols are used for all elements.

ABBREVIATIONS FOR LANGUAGES

	Language of text
Dutch	Nl
French	Fr
German	De
Italian	It
Japanese	Ja
Norwegian	No
Spanish	Es
Swedish	Sv

CONTENTS

Page No

01. General ... 475
02. Food Processing ... 475
03. Food Packaging ... 476
04. Food Engineering and Equipment ... 476
05. Energy in Food Processing ... 479
06. Food Chemistry and Analysis ... 479
07. Food Microbiology and Hygiene ... 479
08. Biotechnology ... -
09. Tissue Culture ... -
10. Food Additives ... 485
11. Cereals ... 488
12. Millets ... 494
13. Pulses ... 496
14. Oilseeds and Nuts ... 500
15. Tubers and Vegetables ... 504
16. Fruits ... 509
17. Confectionery, Starch and Sugar ... 514
18. Bakery Products ... 517
19. Milk and Dairy Products ... 517
20. Meat and Poultry ... 523
21. Seafoods ... 527
22. Protein Foods ... -
23. Alcoholic and Non-alcoholic Beverages ... 533
24. Fats and Oils ... 538
25. Spices and Condiments ... 541
26. Sensory Evaluation ... -
27. Food Storage ... 542
28. Infestation Control and Pesticides ... 543
29. Biochemistry and Nutrition ... 545
30. Toxicology ... 546
31. Food Laws and Regulations ... -

Index

For xerox copies of articles included in this publication and also for translation service

Please write to:

Head, Food Science and Technology Information Service (FOSTIS), ABBREVIATIONS

A	ampere
AAS	atomic absorption spectrometry
abstr.	abstract
ad lib.	ad libitum
ADP	adenosine diphosphate
Anon.	Anonymous
AOAC	Association of Official Analytical Chemists
approx.	approximately
atm	atmosphere
ATP	adenosine triphosphate
a_w	water activity
BHA	butylated hydroxyanisole
BHT	butylated hydroxytoluene
BOD	biological oxygen demand
b.p.	boiling point
Btu	British thermal unit
c-	centi- (as in cm,cm^2, cm^3)
cal	calorie
cd	candela
Ci	curie
CMC	carboxymethyl cellulose
COD	chemical oxygen demand
coeff.	coefficient
conc.	concentrated
concn.	concentration
cv.	cultivar
cwt	hundredweight
d-	deci-
DE	dextrose equivalent
detn.	determination
DFD	dark firm dry
diam.	diameter
dil.	dilute
DM	dry matter, Deutsche Mark
DNA	deoxyribonucleic acid(s)
dyn	dyne
E.	East, Eastern, etc.
ECD.	electron capture detection
EDTA	ethylenediaminetetraacetic acid
Eh	oxidation-reduction potential
ELISA	enzyme-linked immuno-sorbent assay
f-	femto- (10^{-15}, as in fCi)
°F	degree Fahrenheit
FAO	Food and Agricultural Organization
FDA	Food and Drug Administration
FID	flame ionization detection
fl oz	fluid ounce
f.p.	freezing point
ft	foot, feet
g	gram
GC	gas chromatography
g_n	gravity
gal	gallon
gf	gram-force
GLC	gas-liquid chromatography
h	hour
ha	hectare
HDPE	high density polyethylene
hl	hectolitre (100 l)
hp	horse power
HPLC	high performance/ pressure liquid chromatography
HTST	high temperature short time
Hz	hertz (frequency cycles/s)
in	inch
IR	infrared
IU	international unit
J	joule
k-	kilo- (as in kcal,kg)
K	Kelvin
l	litre
lb	pound
lbf	pound-force
LDPE	low density polyethylene
m-	milli- (as in mg,ml,mm)
m-equiv	milli-equivalent
m	molar concentration
M-	mega- (as in Mrad)
max.	maximum
min	minute (time)
min.	minimum
mol	mole
mol.wt.	molecular weight
m.p.	melting point
MPN	most probable number
MS	mass-spectrometry
n-	nano-(10^{-9}, as in nm)
N	Newton (kg m/s^2)
N.	North, Northern, etc.
	normal concentration
NMR	nuclear magnetic resonance
NPU	net protein utilization
oz	ounce
p-	pico- (10^{-12}, as in pCi)
P	Poise
P	probability
Pa	Pascal (N/m^2)
PAGE	polyacrylamide gel electrophoresis
PER	protein efficiency ratio
p.p.b.	parts per billion
p.p.m.	parts per million
PSE	pale soft exudative
PTFE	polytetrafluorethylene
PVC	polyvinyl chloride
PVDC	polyvinylidene chloride
qt	quart
R	rontgen
rad	rad or radian
ref.	reference(s)
rev/min	revolutions per minute
RH	relative humidity
RNA	ribonucleic acid(s)
S.	South, Southern, etc.
s.d.	standard deviation
SDS	sodium dodecylsulphate
s.e.	standard error
s	second (time)
SNF	solids-not-fat
sp.,spp.	species
sp.gr.	specific gravity
summ.	summary
Suppl.	Supplement
t	metric tonne
temp.	temperature
TLC	thin layer chromatography
TS	total solids
UHT	ultra-high temperature
UV	ultraviolet
V	volt
var.	variety
vol.	volume
v/v	volume/volume
W	watt
W.	West, Western, etc.
WHO	World Health Organization
w/v	weight/volume
wk	week
wt.	weight
yd	yard
yr	year
μ	micro-(as in μg, μm)
%	per centum
>	greater than
≥	greater than or equal to; not less than
<	less than
≤	less than or equal to; not greater than

Chemical symbols are used for a elements.

ABBREVIATIONS FOR LANGUAGES

	Language of text
Dutch	Nl
French	Fr
German	De
Italian	It
Japanese	Ja
Norwegian	No
Spanish	Es
Swedish	Sv

CONTENTS

Page No

01. General ... 549
02. Food Processing ... 550
03. Food Packaging ... 550
04. Food Engineering and Equipment ... 551
05. Energy in Food Processing ... -
06. Food Chemistry and Analysis ... 552
07. Food Microbiology and Hygiene ... 553
08. Biotechnology ... -
09. Tissue Culture ... 558
10. Food Additives ... 559
11. Cereals ... 559
12. Millets ... 563
13. Pulses ... 565
14. Oilseeds and Nuts ... 568
15. Tubers and Vegetables ... 572
16. Fruits ... 577
17. Confectionery, Starch and Sugar ... 585
18. Bakery Products ... 586
19. Milk and Dairy Products ... 589
20. Meat and Poultry ... 597
21. Seafoods ... 605
22. Protein Foods ... 613
23. Alcoholic and Non-alcoholic Beverages ... 614
24. Fats and Oils ... 617
25. Spices and Condiments ... 618
26. Sensory Evaluation ... 619
27. Food Storage ... 620
28. Infestation Control and Pesticides ... -
29. Biochemistry and Nutrition ... 621
30. Toxicology ... 622
31. Food Laws and Regulations ... -

Index

For xerox copies of articles included in this publication and also for translation service

Please write to:

Head, Food Science and Technology Information Service (FOSTIS),
CFTRI, Mysore — 570 013, India.

ABBREVIATIONS

A	ampere
AAS	atomic absorption spectrometry
abstr.	abstract
ad lib.	ad libitum
ADP	adenosine diphosphate
Anon.	Anonymous
AOAC	Association of Official Analytical Chemists
approx.	approximately
atm	atmosphere
ATP	adenosine triphosphate
a_w	water activity
BHA	butylated hydroxyanisole
BHT	butylated hydroxytoluene
BOD	biological oxygen demand
b.p.	boiling point
Btu	British thermal unit
c-	centi- (as in cm, cm^2, cm^3)
cal	calorie
cd	candela
Ci	curie
CMC	carboxymethyl cellulose
COD	chemical oxygen demand
coeff.	coefficient
conc.	concentrated
concn.	concentration
cv.	cultivar
cwt	hundredweight
d-	deci-
DE	dextrose equivalent
detn.	determination
DFD	dark firm dry
diam.	diameter
dil.	dilute
DM	dry matter, Deutsche Mark
DNA	deoxyribonucleic acid(s)
dyn	dyne
E.	East, Eastern, etc.
ECD.	electron capture detection
EDTA	ethylenediaminetetraacetic acid
Eh	oxidation-reduction potential
ELISA	enzyme-linked immuno-sorbent assay
f-	femto- (10^{-15}, as in fCi)
$^{\circ}$F	degree Fahrenheit
FAO	Food and Agricultural Organization
FDA	Food and Drug Administration
FID	flame ionization detection
fl oz	fluid ounce
f.p.	freezing point
ft	foot, feet
g	gram
GC	gas chromatography
g_n	gravity
gal	gallon
gf	gram-force
GLC	gas-liquid chromatography
h	hour
ha	hectare
HDPE	high density polyethylene
hl	hectolitre (100 l)
hp	horse power
HPLC	high performance/pressure liquid chromatography
HTST	high temperature short time
Hz	hertz (frequency cycles/s)
in	inch
IR	infrared
IU	international unit
J	joule
k-	kilo- (as in kcal, kg)
K	Kelvin
l	litre
lb	pound
lbf	pound-force
LDPE	low density polyethylene
m-	milli- (as in mg, ml, mm)
m-equiv	milli-equivalent
M	molar concentration
M-	mega- (as in Mrad)
max.	maximum
min	minute (time)
min.	minimum
mol	mole
mol.wt.	molecular weight
m.p.	melting point
MPN	most probable number
MS	mass-spectrometry
n-	nano- (10^{-9}, as in nm)
N	Newton (kg m/s^2)
N.	North, Northern, etc.
	normal concentration
NMR	nuclear magnetic resonance
NPU	net protein utilization
oz	ounce
p-	pico- (10^{-12}, as in pCi)
P	Poise
P	probability
Pa	Pascal (N/m^2)
PAGE	polyacrylamide gel electrophoresis
PER	protein efficiency ratio
p.p.b.	parts per billion
p.p.m.	parts per million
PSE	pale soft exudative
PTFE	polytetrafluorethylene
PVC	polyvinyl chloride
PVDC	polyvinylidene chloride
qt	quart
R	rontgen
rad	rad or radian
ref.	reference(s)
rev/min	revolutions per minute
RH	relative humidity
RNA	ribonucleic acid(s)
S.	South, Southern, etc.
s.d.	standard deviation
SDS	sodium dodecylsulphate
s.e.	standard error
s	second (time)
SNF	solids-not-fat
sp., spp.	species
sp.gr.	specific gravity
summ.	summary
Suppl.	Supplement
t	metric tonne
temp.	temperature
TLC	thin layer chromatography
TS	total solids
UHT	ultra-high temperature
UV	ultraviolet
V	volt
var.	variety
vol.	volume
v/v	volume/volume
W	watt
W.	West, Western, etc.
WHO	World Health Organization
w/v	weight/volume
wk	week
wt.	weight
yd	yard
yr	year
µ	micro-(as in µg, µm)
%	per centum
>	greater than
⩾	greater than or equal to; not less than
<	less than
⩽	less than or equal to; not greater than

Chemical symbols are used for al elements.

ABBREVIATIONS FOR LANGUAGES

	Language of text
Dutch	Nl
French	Fr
German	De
Italian	It
Japanese	Ja
Norwegian	No
Spanish	Es
Swedish	Sv

CONTENTS

Page No

01. General ... 625
02. Food Processing ... 625
03. Food Packaging ... 626
04. Food Engineering and Equipment ... 627
05. Energy in Food Processing ... –
06. Food Chemistry and Analysis ... 628
07. Food Microbiology and Hygiene ... 629
08. Biotechnology ... 634
09. Tissue Culture ... –
10. Food Additives ... 635
11. Cereals ... 636
12. Millets ... 647
13. Pulses ... 651
14. Oilseeds and Nuts ... 655
15. Tubers and Vegetables ... 662
16. Fruits ... 668
17. Confectionery, Starch and Sugar ... 672
18. Bakery Products ... 674
19. Milk and Dairy Products ... 680
20. Meat and Poultry ... 683
21. Seafoods ... 688
22. Protein Foods ... –
23. Alcoholic and Non-alcoholic Beverages ... 693
24. Fats and Oils ... 697
25. Spices and Condiments ... 698
26. Sensory Evaluation ... 699
27. Food Storage ... 700
28. Infestation Control and Pesticides ... 701
29. Biochemistry and Nutrition ... 702
30. Toxicology ... –
31. Food Laws and Regulations ... –

Index

For xerox copies of articles included in this publication and also for translation service

Please write to:

Head, Food Science and Technology Information Service (FOSTIS),
CFTRI Mysore — 570 013, India.

ABBREVIATIONS

	ampere
	atomic absorption spectrometry
str.	abstract
lib.	ad libitum
P	adenosine diphosphate
on.	Anonymous
AC	Association of Official Analytical Chemists
prox.	approximately
m	atmosphere
P	adenosine triphosphate
	water activity
A	butylated hydroxyanisole
T	butylated hydroxytoluene
D	biological oxygen demand
p.	boiling point
u	British thermal unit
	centi- (as in cm,cm^2, cm^3)
l	calorie
	candela
	curie
C	carboxymethyl cellulose
D	chemical oxygen demand
eff.	coefficient
nc.	concentrated
ncn.	concentration
.	cultivar
t	hundredweight
	deci-
	dextrose equivalent
tn.	determination
D	dark firm dry
am.	diameter
l.	dilute
	dry matter, Deutsche Mark
A	deoxyribonucleic acid(s)
n	dyne
	East, Eastern, etc.
D.	electron capture detection
TA	ethylenediaminetetraacetic acid
	oxidation-reduction potential
ISA	enzyme-linked immuno-sorbent assay
	femto- (10^{-15}, as in fCi)
	degree Fahrenheit
O	Food and Agricultural Organization
A	Food and Drug Administration
D	flame ionization detection
oz	fluid ounce
p.	freezing point
	foot, feet

g	gram
GC	gas chromatography
g_n	gravity
gal	gallon
gf	gram-force
GLC	gas-liquid chromatography
h	hour
ha	hectare
HDPE	high density polyethylene
hl	hectolitre (100 l)
hp	horse power
HPLC	high performance/ pressure liquid chromatography
HTST	high temperature short time
Hz	hertz (frequency cycles/s)
in	inch
IR	infrared
IU	international unit
J	joule
k-	kilo- (as in kcal,kg)
K	Kelvin
l	litre
lb	pound
lbf	pound-force
LDPE	low density polyethylene
m-	milli- (as in mg,ml,mm)
m-equiv	milli-equivalent
M	molar concentration
M-	mega- (as in Mrad)
max.	maximum
min	minute (time)
min.	minimum
mol	mole
mol.wt.	molecular weight
m.p.	melting point
MPN	most probable number
MS	mass-spectrometry
n-	nano-(10^{-9}, as in nm)
N	Newton (kg m/s^2)
N.	North, Northern, etc.
	normal concentration
NMR	nuclear magnetic resonance
NPU	net protein utilization
oz	ounce
p-	pico- (10^{-12}, as in pCi)
P	Poise
P	probability
Pa	Pascal (N/m^2)
PAGE	polyacrylamide gel electrophoresis
PER	protein efficiency ratio
p.p.b.	parts per billion
p.p.m.	parts per million
PSE	pale soft exudative
PTFE	polytetrafluorethylene
PVC	polyvinyl chloride
PVDC	polyvinylidene chloride
qt	quart
R	rontgen
rad	rad or radian
ref.	reference(s)

rev/min	revolutions per minute
RH	relative humidity
RNA	ribonucleic acid(s)
S.	South, Southern, etc.
s.d.	standard deviation
SDS	sodium dodecylsulphate
s.e.	standard error
s	second (time)
SNF	solids-not-fat
sp.,spp.	species
sp.gr.	specific gravity
summ.	summary
Suppl.	Supplement
t	metric tonne
temp.	temperature
TLC	thin layer chromatography
TS	total solids
UHT	ultra-high temperature
UV	ultraviolet
V	volt
var.	variety
vol.	volume
v/v	volume/volume
W	watt
W.	West, Western, etc.
WHO	World Health Organization
w/v	weight/volume
wk	week
wt.	weight
yd	yard
yr	year
μ	micro-(as in μg, μm)
%	per centum
>	greater than
⩾	greater than or equal to; not less than
<	less than
⩽	less than or equal to; not greater than

Chemical symbols are used for all elements.

ABBREVIATIONS FOR LANGUAGES

	Language of text
Dutch	Nl
French	Fr
German	De
Italian	It
Japanese	Ja
Norwegian	No
Spanish	Es
Swedish	Sv

CONTENTS

Page No

01. General ... 705
02. Food Processing ... 707
03. Food Packaging ... 708
04. Food Engineering and Equipment ... 709
05. Energy in Food Processing ... 710
06. Food Chemistry and Analysis ... 710
07. Food Microbiology and Hygiene ... 711
08. Biotechnology ... –
09. Tissue Culture ... –
10. Food Additives ... 715
11. Cereals ... 716
12. Millets ... 719
13. Pulses ... 720
14. Oilseeds and Nuts ... 723
15. Tubers and Vegetables ... 726
16. Fruits ... 729
17. Confectionery, Starch and Sugar ... 733
18. Bakery Products ... 734
19. Milk and Dairy Products ... 736
20. Meat and Poultry ... 741
21. Seafoods ... 746
22. Protein Foods ... –
23. Alcoholic and Non-alcoholic Beverages ... 754
24. Fats and Oils ... 758
25. Spices and Condiments ... 759
26. Sensory Evaluation ... 760
27. Food Storage ... 760
28. Infestation Control and Pesticides ... 761
29. Biochemistry and Nutrition ... 761
30. Toxicology ... –
31. Food Laws and Regulations ... –

Index

ABBREVIATIONS

A	ampere
AAS	atomic absorption spectrometry
abstr.	abstract
ad lib.	ad libitum
ADP	adenosine diphosphate
Anon.	Anonymous
AOAC	Association of Official Analytical Chemists
approx.	approximately
atm	atmosphere
ATP	adenosine triphosphate
a_w	water activity
BHA	butylated hydroxyanisole
BHT	butylated hydroxytoluene
BOD	biological oxygen demand
b.p.	boiling point
Btu	British thermal unit
c-	centi- [as in cm, cm^2, cm^3]
cal	calorie
cd	candela
Ci	curie
CMC	carboxymethyl cellulose
COD	chemical oxygen demand
coeff.	coefficient
conc.	concentrated
concn.	concentration
cv.	cultivar
cwt	hundredweight
d-	deci-
DE	dextrose equivalent
detn.	determination
DFD	dark firm dry
diam.	diameter
dil.	dilute
DM	dry matter, Deutsche Mark
DNA	deoxyribonucleic acid(s)
dyn	dyne
E.	East, Eastern, etc.
ECD.	electron capture detection
EDTA	ethylenediaminetetra-acetic acid
Eh	oxidation-reduction potential
ELISA	enzyme-linked immunosorbent assay
f-	femto- [10^{-15}, as in fCi]
°F	degree Fahrenheit
FAO	Food and Agricultural Organization
FDA	Food and Drug Administration
FID	flame ionization detection
fl oz	fluid ounce
f.p.	freezing point
ft	foot, feet
g	gram
GC	gas chromatography
gn	gravity
gal	gallon
gf	gram-force
GLC	gas-liquid chromatography
h	hour
ha	hectare
HDPE	high density polyethylene
hl	hectolitre [100 l]
hp	horse power
HPLC	high performance/pressure liquid chromatography
HTST	high temperature short time
Hz	hertz [frequency cycles/s]
in	inch
IR	infrared
IU	international unit
J	joule
k-	kilo- [as in kcal, kg]
K	Kelvin
l	litre
lb	pound
lbf	pound-force
LDPE	low density polyethylene
m-	milli- [as in mg, ml, mm]
m-equiv	milli-equivalent
m	molar concentration
M-	mega- [as in Mrad]
max.	maximum
min	minute [time]
min.	minimum
mol	mole
mol.wt.	molecular weight
m.p.	melting point
MPN	most probable number
MS	mass-spectrometry
n-	nano-[10^{-9}, as in nm]
N	Newton [kg m/s^2]
N.	North, Northern, normal concentration
NMR	nuclear magnetic resonance
NPU	net protein utilization
oz	ounce
p-	pico- [10^{-12}, as in pCi]
P	poise
P	probability
Pa	Pascal [N/m^2]
PAGE	polyacrylamide gel electrophoresis.
PER	protein efficiency ratio
p.p.b.	parts per billion
p.p.m.	parts per million
PSE	pale soft exudative
PTFE	polytetra-fluorethylene
PVC	polyvinyl chloride
PVDC	polyvinylidene chloride
qt	quart
R	rontgen
rad	rad or radian
ref.	reference(s)
rev/min	revolutions per minute
RH	relative humidity
RNA	ribonucleic acid(s)
S.	South, Southern, etc.
s.d.	standard deviation
SDS	sodium dedecyl-sulphate
s.e.	standard error
s	second [time]
SNF	solids-not-fat
sp., spp.	species
sp.gr.	specific gravity
summ.	summary
Suppl.	Supplement
t	metric tonne
temp.	temperature
TLC	thin layer chromatography
TS	total solids
UHT	ultra-high temperature
UV	ultraviolet
V	volt
var.	variety
vol.	volume
v/v	volume/volume
w	watt
W.	West, Western, etc.
WHO	World Health Organization
w/v	weight/volume
wk	week
wt.	weight
yd	yard
yr	year
μ	micro-[as in g, m]
%	per centum
>	greater than
≥	greater than or equal to; not less than
<	less than
≤	less than or equal to; not greater than

Chemical symbols are used for all elements.

ABBREVIATIONS FOR LANGUAGES

	Language of text
Dutch	Nl
French	Fr
German	De
Italian	It
Japanese	Ja
Norwegian	No
Spanish	Es
Swedish	Sv

§§§§

CONTENTS

Page No

01. General ... 763
02. Food Processing ... 764
03. Food Packaging ... 765
04. Food Engineering and Equipment ... 765
05. Energy in Food Processing ... -
06. Food Chemistry and Analysis ... 766
07. Food Microbiology and Hygiene ... 767
08. Biotechnology ... 773
09. Tissue Culture ... 773
10. Food Additives ... 774
11. Cereals ... 777
12. Millets ... 780
13. Pulses ... 781
14. Oilseeds and Nuts ... 782
15. Tubers and Vegetables ... 784
16. Fruits ... 788
17. Confectionery, Starch and Sugar ... 790
18. Bakery Products ... 792
19. Milk and Dairy Products ... 793
20. Meat and Poultry ... 801
21. Seafoods ... 809
22. Protein Foods ... 814
23. Alcoholic and Non-alcoholic Beverages ... 815
24. Fats and Oils ... 819
25. Spices and Condiments ... 822
26. Sensory Evaluation ... -
27. Food Storage ... -
28. Infestation Control and Pesticides ... 825
29. Biochemistry and Nutrition ... 827
30. Toxicology ... 828
31. Food Laws and Regulations ... -

Index

ABBREVIATIONS

A	ampere
AAS	atomic absorption spectrometry
abstr.	abstract
ad lib.	ad libitum
ADP	adenosine diphosphate
Anon.	Anonymous
AOAC	Association of Official Analytical Chemists
approx.	approximately
atm	atmosphere
ATP	adenosine triphosphate
a_w	water activity
BHA	butylated hydroxyanisole
BHT	butylated hydroxytoluene
BOD	biological oxygen demand
b.p.	boiling point
Btu	British thermal unit
c-	centi- [as in cm, cm^2, cm^3]
cal	calorie
cd	candela
Ci	curie
CMC	carboxymethyl cellulose
COD	chemical oxygen demand
coeff.	coefficient
conc.	concentrated
concn.	concentration
cv.	cultivar
cwt	hundredweight
d-	deci-
DE	dextrose equivalent
detn.	determination
DFD	dark firm dry
diam.	diameter
dil.	dilute
DM	dry matter, Deutsche Mark
DNA	deoxyribonucleic acid(s)
dyn	dyne
E.	East, Eastern, etc.
ECD.	electron capture detection
EDTA	ethylenediaminetetraacetic acid
Eh	oxidation-reduction potential
ELISA	enzyme-linked immunosorbent assay
f-	femto- [10^{-15}; as in fCi]
°F	degree Fahrenheit
FAO	Food and Agricultural Organization
FDA	Food and Drug Administration
FID	flame ionization detection
fl oz	fluid ounce
f.p.	freezing point
ft	foot, feet
g	gram
GC	gas chromatography
gn	gravity
gal	gallon
gf	gram-force
GLC	gas-liquid chromatography
h	hour
ha	hectare
HDPE	high density polyethylene
hl	hectolitre [100 l]
hp	horse power
HPLC	high performance/pressure liquid chromatography
HTST	high temperature short time
Hz	hertz [frequency cycles/s]
in	inch
IR	infrared
IU	international unit
J	joule
k-	kilo- [as in kcal, kg]
K	Kelvin
l	litre
lb	pound
lbf	pound-force
LDPE	low density polyethylene
m-	milli- [as in mg, ml, mm]
m-equiv	milli-equivalent
m	molar concentration
M-	mega- [as in Mrad]
max.	maximum
min	minute [time]
min.	minimum
mol	mole
mol.wt.	molecular weight
m.p.	melting point
MPN	most probable number
MS	mass-spectrometry
n-	nano-[10^{-9}, as in nm]
N	Newton [kg m/s^2]
N.	North, Northern, normal concentration
NMR	nuclear magnetic resonance
NPU	net protein utilization
oz	ounce
p-	pico- [10^{-12}, as in pCi]
P	poise
p	probability
Pa	Pascal [N/m^2]
PAGE	polyacrylamide gel electrophoresis.
PER	protein efficiency ratio
p.p.b.	parts per billion
p.p.m.	parts per million
PSE	pale soft exudative
PTFE	polytetrafluorethylene
PVC	polyvinyl chloride
PVDC	polyvinylidene chloride
qt	quart
R	rontgen
rad	rad or radian
ref.	reference(s)
rev/min	revolutions per minute
RH	relative humidity
RNA	ribonucleic acid(s)
S.	South, Southern, etc.
s.d.	standard deviation
SDS	sodium dedecylsulphate
s.e.	standard error
s	second [time]
SNF	solids-not-fat
sp., spp.	species
sp.gr.	specific gravity
summ.	summary
Suppl.	Supplement
t	metric tonne
temp.	temperature
TLC	thin layer chromatography
TS	total solids
UHT	ultra-high temperature
UV	ultraviolet
V	volt
var.	variety
vol.	volume
v/v	volume/volume
W	watt
W.	West, Western, etc.
WHO	World Health Organization
w/v	weight/volume
wk	week
wt.	weight
yd	yard
yr	year
µ	micro-[as in g, m]
%:	per centum
>	greater than
≥	greater than or equal to; not less than
<	less than
≤	less than or equal to; not greater than

Chemical symbols are used for all elements.

ABBREVIATIONS FOR LANGUAGES

	Language of text
Dutch	Nl
French	Fr
German	De
Italian	It
Japanese	Ja
Norwegian	No
Spanish	Es
Swedish	Sv

§§§§

CONTENTS

		Page No
01.	General	... 831
02.	Food Processing	... 832
03.	Food Packaging	... 832
04.	Food Engineering and Equipment	... 832
05.	Energy in Food Processing	... -
06.	Food Chemistry and Analysis	... 833
07.	Food Microbiology and Hygiene	... 836
08.	Biotechnology	... 838
09.	Tissue Culture	... -
10.	Food Additives	... 838
11.	Cereals	... 841
12.	Millets	... 850
13.	Pulses	... 851
14.	Oilseeds and Nuts	... 854
15.	Tubers and Vegetables	... 858
16.	Fruits	... 861
17.	Confectionery, Starch and Sugar	... 863
18.	Bakery Products	... 864
19.	Milk and Dairy Products	... 869
20.	Meat and Poultry	... 876
21.	Seafoods	... 883
22.	Protein Foods	... -
23.	Alcoholic and Non-alcoholic Beverages	... 886
24.	Fats and Oils	... 890
25.	Spices and Condiments	... 895
26.	Sensory Evaluation	... 898
27.	Food Storage	... -
28.	Infestation Control and Pesticides	... 898
29.	Biochemistry and Nutrition	... 900
30.	Toxicology	... -
31.	Food Laws and Regulations	... -
	Index	

ABBREVIATIONS

A	ampere
AAS	atomic absorption spectrometry
abstr.	abstract
ad lib.	ad libitum
ADP	adenosine diphosphate
Anon.	Anonymous
AOAC	Association of Official Analytical Chemists
approx.	approximately
atm	atmosphere
ATP	adenosine triphosphate
a_w	water activity
BHA	butylated hydroxyanisole
BHT	butylated hydroxytoluene
BOD	biological oxygen demand
b.p.	boiling point
Btu	British thermal unit
c-	centi- [as in cm, cm^2, cm^3]
cal	calorie
cd	candela
Ci	curie
CMC	carboxymethyl cellulose
COD	chemical oxygen demand
coeff.	coefficient
conc.	concentrated
concn.	concentration
cv.	cultivar
cwt	hundredweight
d-	deci-
DE	dextrose equivalent
detn.	determination
DFD	dark firm dry
diam.	diameter
dil.	dilute
DM	dry matter, Deutsche Mark
DNA	deoxyribonucleic acid(s)
dyn	dyne
E.	East, Eastern, etc.
ECD.	electron capture detection
EDTA	ethylenediaminetetraacetic acid
Eh	oxidation-reduction potential
ELISA	enzyme-linked immunosorbent assay
f-	femto- [10^{-15}, as in fCi]
°F	degree Fahrenheit
FAO	Food and Agricultural Organization
FDA	Food and Drug Administration
FID	flame ionization detection
fl oz	fluid ounce
f.p.	freezing point
ft	foot, feet
g	gram
GC	gas chromatography
gn	gravity
gal	gallon
gf	gram-force
GLC	gas-liquid chromatography
h	hour
ha	hectare
HDPE	high density polyethylene
hl	hectolitre [100 l]
hp	horse power
HPLC	high performance/pressure liquid chromatography
HTST	high temperature short time
Hz	hertz [frequency cycles/s]
in	inch
IR	infrared
IU	international unit
J	joule
k-	kilo- [as in kcal, kg]
K	Kelvin
l	litre
lb	pound
lbf	pound-force
LDPE	low density polyethylene
m-	milli- [as in mg, ml, mm]
m-equiv	milli-equivalent
m	molar concentration
M-	mega- [as in Mrad]
max.	maximum
min	minute [time]
min.	minimum
mol	mole
mol.wt.	molecular weight
m.p.	melting point
MPN	most probable number
MS	mass-spectrometry
n-	nano-[10^{-9}, as in nm]
N	Newton [$kg\ m/s^2$]
N.	North, Northern, normal concentration
NMR	nuclear magnetic resonance
NPU	net protein utilization
oz	ounce
p-	pico- [10^{-12}, as in pCi]
P	poise
p	probability
Pa	Pascal [N/m^2]
PAGE	polyacrylamide gel electrophoresis.
PER	protein efficiency ratio
p.p.b.	parts per billion
p.p.m.	parts per million
PSE	pale soft exudative
PTFE	polytetrafluorethylene
PVC	polyvinyl chloride
PVDC	polyvinylidene chloride
qt	quart
R	rontgen
rad	rad or radian
ref.	reference(s)
rev/min	revolutions per minute
RH	relative humidity
RNA	ribonucleic acid(s)
S.	South, Southern, etc.
s.d.	standard deviation
SDS	sodium dodecylsulphate
s.e.	standard error
s	second [time]
SNF	solids-not-fat
sp., spp.	species
sp.gr.	specific gravity
summ.	summary
Suppl.	Supplement
t	metric tonne
temp.	temperature
TLC	thin layer chromatography
TS	total solids
UHT	ultra-high temperature
UV	ultraviolet
V	volt
var.	variety
vol.	volume
v/v	volume/volume
W	watt
W.	West, Western, etc.
WHO	World Health Organization
w/v	weight/volume
wk	week
wt.	weight
yd	yard
yr	year
µ	micro-[as in g, m]
%	per centum
>	greater than
≥	greater than or equal to; not less than
<	less than
≤	less than or equal to; not greater than

Chemical symbols are used for all elements.

ABBREVIATIONS FOR LANGUAGES

	Language of text
Dutch	Nl
French	Fr
German	De
Italian	It
Japanese	Ja
Norwegian	No
Spanish	Es
Swedish	Sv

§§§§

GENERAL

1 Farrer (KTH). Quo Vadis-Food and well being. A critical appraisal. **Food Technology in Australia** 40(1); 1988; 10-12

This review discusses the various aspects of food contributing to the well being. This subject has been divided into three parts viz, 1) Dealing with effects which are positively deleterious and well being does not include dangers due to cyanogens pyrrolizidine alkaloids fish and honey poisons or carcinogens; 2) Supply of micronutrients and their effectiveness at the sub-clinical level; and 3) Dealing with public perceptions and market reactions there to both of them quite often irrational but nevertheless significant. NGKR

2 Zipfel (W). Delimiting criteria for foodstuffs, cosmetics, pharmaceutics. **Deutsche Lebensmittel-Rundschau** 84(6); 1988; 171-176 (De).

FOOD PROCESSING

Nil

FOOD PACKAGING

3 Zagory (D) and Koder (AA). Modified atmosphere packaging of fresh produce. **Food Technology** 42(9); 1988; 70-77

This article deals with factors which should be considered in creating gaseous microenvironments for packaged produce to maintain the quality of fresh fruits and vegetables. This also describes films for modified atm. packaging (MAP) and compares several mathematical models of atmospheric modification within packages. In conclusion MAP has been projected as practical alternative to controlled atm. facility to maintain the physical and flavour qualities of fresh produce. GAR

Canning

4 Lazaridis (HN) and Sander (EH). Home-canning of food. Effect of a higher process temperature (121 C) on the quality of low-acid foods. **Journal of Food Science** 53(3); 1988; 985-986

This study compared the effects of a 121 C (103 kPa) process with those of the traditional process on the quality of home-canned, low-acid vegetables: asparagus (mainly convection heat), strained squash (conduction heat), and peas (a combination of convection and conduction heat). Quality was assessed objectively (texture and colour) and by sensory evaluation (texture, colour and flavour). The higher temp. process did not adversely affect quality; in the case of squash it resulted in quality improvement. AS

Packaging materials

5 Figge (K), Rabel (W), Baustian (M) and Meier (F). Influence of the thickness of polymeric packaging materials on the migration of components into fat releasing foodstuffs. Part 1. Brief introduction and results. **Deutsche Lebensmittel-Rundschau** 84(6); 1988; 177-180 (De).

6 Risch (SJ). Migration of toxicants, flavours, and odour-active substances from flexible packaging materials to food. **Food Technology** 42(7); 1988; 95-102

Discusses migration of potential toxicants from package components (plasticizers, vinyl chloride, amine precursors, nitrosamines, and other migrants), migration of odour-active substances from package components (case studies, avoidance of potential problems through quality control), regulation of package components (United States and EEC) migration testing requirements for package and current perspective and recommendations. BV

Polyethylene

7 Figge (K), Rabel (W), Baustian M) and Meier (F). Influence of the thickness of polymeric packaging materials on the migration of components into fat releasing foodstuffs. Part 2. Results of experiments with polyethylene materials. **Deutsche Lebensmittel-Rundschau** 84(6); 1988; 180-185 (De).

Polymers

8 Sadler (GD) and Nelson (PE). Altered oxygen permeation through packaging polymers in contact with liquids-a mathematical model confirmed in a dilute xanthan gum solution. Journal of Food Science 53(3); 1988; 873-876

The ability of liquids to reduce oxygen permeation through low density polyethylene (LDPE), oriented polypropylene (OPP), polyethylene terepthalate (PET), and polyvinylidene chloride (PVDC) films was mathematically modeled using a water/xanthan solution as a model medium. For low barrier films (LDPE and OPP), the medium substantially reduced oxygen permeation. In PET, an intermediate barrier, the medium produced a recognizable, but minor reductions in permeation. For the highest barrier (PVDC), the medium's influence on permeation was almost unidentifiable. The effect of the medium's oxygen solubility constant and diffusion coeff. on permeation was also examined. For all films, reduction in permeation became significant only after solubility and diffusion values fell below 40% of water values. AS

Polypropylene films

9 Ikegami (T), Shimoda (M) and Osajima (Y). Sorption of volatile compounds by polypropylene film. Journal of Japanese Society of Food Science and Technology '(Nippon Shokuhin Kogyo Gakkaishi') 35(7); 1988; 457-463 (Ja).

Several kinds of pouches (Polyethylene terephthalate (PET)/Aluminum foil (Al)/Polypropylene (PP)) were filled with a model flavour solution, containing 40 kinds of volatile compounds. The effect of film characteristics and structure of volatile compounds on the sorption was investigated in order to elucidate the sorption behaviour of volatile compounds into polypropylene liner. (1) The distribution ratios (content in film/solution) were greatly influenced by functional groups of the volatile compounds. The distribution ratios became increased as follows; alcohols < aldehydes < esters terpene hydrocarbons. (2) In homologous series of esters and aldehydes, the plots of distribution ratios gave a straight-line plot on semi-log coordinates and the slope indicated that distribution ratios increased about threefold for each methylene group. However, for the compounds composed of 10 or more carbon atoms, the increments in distribution ratios were less or negative. (3) Comparing solubility and diffusion coeff. in PP with those in PE film, the solubility coeff. in PP was larger than that in PE by a factor of about 1.2, but diffusion coeff. in PP was a twentieth of that in PE. As a result, volatile compounds were much sorpted into PP film under sorption equilibrium, although the sorption proceeded slowly. AS

FOOD ENGINEERING AND EQUIPMENT

Engineering

10 Balaban (M) and Pigott (GM). Mathematical model of simultaneous heat and mass transfer in food with dimensional changes and variable transport parameters. Journal of Food Science 53(3); 1988; 935-939

The variable grid central finite difference method was used in the solution of simultaneous heat and moisture transfer (SHMT)equations with variable transport parameters, providing production of local moisture content, temp. and dimensional changes in an infinite slab at any time during processing. The model was applied to the air drying of ocean perch (Sebastes marinus). Good agreement between experimental results and model predications indicated that the method could be successfully applied to SHMT operations in foods involving dimensional changes. AS

11 Riedel (HR). Production of pastilles, coffee bean and lentil shapes by Aasted drop-roll moulding plant. Confectionery Production 53(11); 1987; 776, 778

Equipments

Driers

12 Nybrant (TG). Modelling and adaptive control of continuous grain driers. Journal of Agricultural Engineering Research 40(3); 1988; 165-173

The object was to develop a mathematical model for cross-flow driers so as to develop adaptive control systems for the driers. The process dynamics of a cross-flow drier depends on factors such as drying air and grain characteristics. The adaptive control system is able to track the varying process dynamics and maintain good control despite changes in grain and drier characteristics. The model developed contains only two unknown parameters. Control experiments carried out in a lab. drier showed that the exhaust air temp. at the bottom of the drying section can be accurately controlled with the adaptive controller which lead to good control of the moisture content. It is suggested that the controller can also be used with mixed- flow drier. RS

ENERGY IN FOOD PROCESSING

Nil

FOOD CHEMISTRY AND ANALYSIS

Chemistry

13 Osterdahl (B-G). Volatile nitrosamines in dried foods. Var Foda 40(6); 1988; 253-258

NDMA was found in a wide var. of foods eg., cocoa, coffee, tea, cereal products, soup powders, spice mixtures, and malt. NPYR was found in cocoa, coffee and spice mixtures. The latter was the only dried food in which NPIP was detected. The highest levels of NDMA was found in shrimp soup powders. BV

14 Petriella (C), Chirife (J), Resnik (S) and Lozano (RD). Solute effects at high water activity on nonenzymatic browning of glucose-lysine solutions. Journal of Food Science 53(3); 1988; 987-988

The effect of different polyols (glycerol, propylene glycol, sorbitol, 1,3-butylene glycol, polyethylene glycol 200, and polyethylene glycol 400) and various alkali metal chlorides (KCl, NaCl, LiCl, and CsCl) on the kinetics of nonenzymatic browning in glucose-lysine solutions of high water activity was studied. No particular inhibitory or promoting effect on browning of glucose-lysine solutions, when adjusting water activity with the various polyols, was found. The alkali metal chlorides had a significant influence on the rate of browning and the relative effect of cations (Li > Na > K, Cs) paralleled the hydrated ionic radii in solutions. AS

15 Shukla (A), Maheswari (PN) and Vasishtha (AK). Reclamation of nickel from spent nickel catalyst. Journal of the American Oil Chemists" Society 65(11); 1988; 1816-1823

Spent nickel catalyst containing an average of 9.6% nickel was treated with mineral acids and mixtures thereof. Nickel recoveries of over 94% were obtained when one part of spent nickel was digested for 3 h with six or more parts of 3 N mixture of HCl and nitric acid (3:1). The hydrogenation activity of the reclaimed nickel catalyst was greater than that of the parent catalyst. MNK

Chemistry(Analytical)

16 Francis (GW) and Isaksen (M). Thin-layer chromatography of carotenoids with tertiary alcohol petroleum ether solutions as developing solvents. Journal of Food Science 53(3); 1988; 979-980

Carotenoid thin-layer chromatography on silica layer using petroleum ether containing tert-butanol or tert-pentanol gave chromatograms with improved separation of oxygenated carotenoids compared with acetone-petroleum ether systems. The effects on the retention of the individual compounds due to the presence of oxygenated substitutents were different for the tert-alcohol and acetone systems. The tert-alcohol systems thus provided separations not available with the acetone system. AS

FOOD MICROBIOLOGY AND HYGIENE

17 Kuhn (EP), Zeyer (J), Eicher (P) and Schwarzenbach (RP). Anaerobic degradation of alkylated benzenes in denitrifying laboratory aquifer columns. Applied and Environmental Microbiology 54(2); 1988; 490-496

Toluene and m-xylene were rapidly mineralized in an aerobic lab. aquifer column operated under continuous flow conditions with nitrate as an electron acceptor. RJ

Enzymes

18 Nguyen (A-L), Grothe (S) and Luong (JH (T). Applications of pullulan in aqueous two-phase systems for enzyme production, purification and utilization. Applied Microbiology and Biotechnology 27(4); 1988; 341-346

Pullulan, a microbial polysaccharide, was employed with polyethylene glycol (PEG) to form an aqueous two-phase system. The phase diagram of the PEG-Pullulan systems as well as the partition of enzymes depended strongly on the mol. wt. of PEG. This behavior provided a basis for the separation of cellulase from Beta-galactosidase. The extractive hydrolysis of lactose, using a commercial preparation of

Beta-galactosidase, could also be performed in a PEG-Pullulan system (16% PEG 1400, 14% Pullulan). The enzyme was effectively contained in the bottom phase while a high percentage of the glucose produced could be removed in the top phase. The enzyme activity was preserved very well after several repeated hydrolyses. Furthermore, it was demonstrated that the PEG-Pullulan system was capable of retaining **Trichoderma reesei** in the bottom phase, allowing the production of cellulase which could be intermittently removed in the top phase. Such a system permitted a semicontinuous production scheme although the enzyme production was observed to decrease after five cycles. In view of the low cost and low viscosity of pullulan, this polysaccharide could be considered a suitable replacement for dextran, a component widely used in aqueous two-phase formulation. **AS**

Chymosin

19 Visser (S), Rollema (HS), Friedenthal (MK) and van Alebeek (GJ). Spectrophotometric method for the determination of chymosin and pepsin in calf and adult bovine rennets. **Netherlands Milk and Dairy Journal** 42(2); 1988; 221-232

This paper describes the details of the method using spectrophotometric assay which is further illustrated by the analyses of nine liquid and five powder rennets obtained from calf and from adult bovine stomachs. This method includes selective inactivation of the chymosin component in a 4.6 M urea-containing buffer at pH-2(15 min. 30 C). Before and after this inactivation step the proteolytic activity of the preparation towards the synthetic hexapeptide Leu-ser-Phe-Nle-Ala-Ileome is measured spectrophotometrically at 230 nm. It was found that for mixtures of the purified enzymes the method gave excellent recoveries. The method is further illustrated by the above analyses and it was found that for liquid calf rennets the relative standard deviations of the repetability for the wt. contents of chymosin and bovine pepsin were 5% and 2% resp. NGKR

Galactosidases

20 Kelly (CT), O Mahony (MR) and Fogarty (WM). A novel thermostable extracellular Beta-galactosidase of **Paecilomyces varioti**. **Applied Microbiology and Biotechnology** 27(4); 1988; 383-388

A novel thermostable extracellular Beta-galactosidase of **Paecilomyces** varioti was purified 47-fold by precipitation with iso-propanol followed by ion-exchange chromatography with carboxymethyl-cellulose and ultrafiltration. An interesting feature of this enzyme was the high activity on cellobiose combined with a remarkably low activity on o-nitrophenyl-Beta-D-galactoside. The enzyme, a glycoprotein, had a mol. wt. of 94, 000 an isoelectric point of 4.1, a pH optimum of 3.5 and a temp. optimum at 50 C. It was 95% stable for 3 h at 60 C. Enzyme activity was inhibited by Hg, Ni, barium, Fe, Cu and p-hydroxymercuribenzoate. A Km of 64 mM for lactose was observed. Glucono-Delta-lactone and glucosamine both effected mixed inhibition. The enzyme displayed transferase activity. **AS**

Fermentation

21 **Kumar (PKR) and Lonsane (BK). Batch and fed-batch solid-state fermentations. Kinetics of cell growth, hydrolytic enzymes production, and gibberellic acid production. Process Biochemistry 23(2); 1988; 43-50**

In this communication the results of studies on the fed-batch culture in solid state fermentation and submerged fermentation techniques involving the feeding of corn starch during idiophase were presented. The results showed that the rate and quantities of production of gibberellic acid, dry cell mass and proteases produced were higher than those in batch solid state fermentation whereas the values for amylases, cellulases and xylanases were lower. Pectinases were found to be absent in both systems and partial inhibition of gibberellic acid formation occured with feed policies involving moist wheat bran medium or glucose as compared to corn starch. This indicated the complex nature of the biochemical changes during the production of gibberellic acid under batch and fed-batch solid state fermentations. NGKR

Microorganisms

22 **Resnik (SL) and Chirife (J). Proposed theoretical water activity values at various temperatures for selected solutions to be used as reference sources in the range of microbial growth. Journal of Food Protection 51(5); 1988; 419-423**

This paper compiles recent data on the theoretical prediction of the water activity of selected saturated salt solutions, unsaturated NaCl and LiCl solutions, and sulphuric acid solutions. These results are presented in tabular form in such a way that they can be used as reference sources for water activity detn. in the range or microbial growth (i.e. about 0.57-0.97) and at different temp. AS

Algae

23 **Ha (YW), Dyck (LA) and Thomas (RL). Hydrocolloids from the freshwater microalgae, Palmella texensis and Cosmarium turpinii. Journal of Food Science 53(3); 1988; 841-844, 909**

The extracellular polysaccharides of two freshwater microalgae were examined as potential sources of hydrocolloids. A 0.10% solution of polysaccharide from **Cosmarium turpinii** (UTEX LB 1042) was pseudoplastic and more viscous than other selected hydrocolloids, indicating an ability to function as a thickening agent. The polysaccharide from **Palmella texensis** (UTEX 1708) produced low viscosity solutions and showed good pH (3.5 to 9.5) and temp. (20 to 80 C) stability. A 1.00% solution of P. texensis polysaccharide showed Newtonian-like flow properties at low shear rate (2.25 sec^{-1} to 45 sec^{-1}). Fructose, xylose, galactose, glucose and glucuronic acid were found from the C. turpinii polysaccharide, and only galactose was identified from the P. texensis polysaccharide. AS

Bacteria

24 Cox (NA), Fung (DYC), Bailey (JS), Hartman (PA) and Vasavada (PC). Miniaturized kits, immunoassays and DNA hybridization for recognition and identification of foodborne bacteria. **Dairy and Food Sanitation** 7(12); 1987; 628-631

Bacillus

25 Kimura (K), Tsukamoto (A), Ishii (Y), Takano (T) and Yamane (K). Cloning of a gene for maltohexaose producing amylase of an alkalophilic **Bacillus** and hyper-production of the enzyme in **Bacillus subtilis** cells. **Applied Microbiology and Biotechnology** 27(4); 1988; 372-377

The gene for maltohexaose producing amylase from an alkalophilic bacterium, **Bacillus** sp. H 707, was cloned in an **Escherichia coli** phage Lambda-D 69 and recloned in an **E. coli** plasmid PBR 322 and a **Bacillus subtilis** plasmid PUB 110, designated the resulting plasmids as PTUE 306 and PTUB 812 resp. The plasmids were stably maintained and the gene was well expressed in the bacterium, **B. subtilis** (PTUB 812) which produced more than 70 times higher activity in the culture medium than did **Bacillus** sp. 707. The major product of hydrolysis of starch by the enzymes of **B. subtilis** (PTUB 812) and **E. coli** (PTUE 306) was maltohexaose. The cloned gene corresponded to one of the genes for five components of malto-oligosaccharide producing amylases of **Bacillus** sp. 707. MSP

26 Sullivan (NM), Mills (DC), Riemann (HP) and Arnon (SS). Evaluation of the Minitek system for characterization of **Bacillus** spceies. **Applied and Environmental Microbiology** 53(11); 1987; 2680-2682

Listeria

27 Klinger (JD) and Johnson (AR). A rapid nucleic acid hybridization assay for **Listeria** in foods. **Food Technology** 42(7); 1988; 66-70

Describes DNA probe that has been developed to identify the presence of **Listeria** in foods. BV

Staphylococcus aureus

28 Kokan (NP) and Bergdoll (MS). Detection of low-enterotoxin-producing **Staphylococcus aureus** strains. **Applied and Environmental Microbiology** 52(11); 1987; 2675-2676

Culture supernatant fluids from 26 (23.6%) monkey feeding test-positive **Staphylococcus aureus** strains, negative for enterotoxins by gel diffusion, were positive by enzyme-linked immunosorbent assay for one or more of the identified enterotoxins. staphylococcal enterotoxin D (SED) was produced by 23 (88.5%) strains, SED and SEA were produced in two strains, and SED and SEC were produced in one strain. One strain produced only SEA, and two strains produced only SEC. **AS**

Streptococcus cremoris

29 Vlegels (PAP), Hazeleger (WC), Helmerhorst (TH) and Wouters (JTM). Phage resistance of **Streptococcus cremoris** due to low adsorption efficiency. **Netherlands Milk and Dairy Journal** 42(2); 1988; 195-206

Fungi

Mushrooms

30 Hsu (AF), Shieh (JJ), Bills (DD) and White (K). Inhibition of mushroom polyphenoloxidase by ascorbic acid derivatives. **Journal of Food Science** 53(3); 1988; 765-767, 771

Ascorbic acid (AA), dehydroascorbic acid (dehydroAA) isoascorbic acid (isoAA), ascorbic acid-2-phosphate , and ascorbic acid-2-sulphate were tested as inhibitors of mushroom polyphenoloxidase (PPO). Kinetic analysis indicated that AA and isoAA were more effective than dehydroAA. The half times (t$_{1}$ 2) that decreased 50% of PPO activity for AA, isoAA and dehydroAA were 2.5, 3.1, and 1.9 h, resp. and the concn that inhibited half of PPO activity were as follows: ascorbic acid, 0.04 mM, isoAA, 0.25 mM; and dehydroAA, 7.5 mM. Electron spin resonance studies demonstrated that the Cu^{2+} of PPO was reduced to Cu^{+} by AA. Ascorbic acid -2-phosphate and ascorbic acid-2-sulphate were not inhibitors for PPO. However, the digestion of ascorbic acid-2-phosphate with acid phosphatase yielded AA to inhibit PPO activity. Ascorbic acid-2-sulphate was found to be a poor substrate for sulphatase. AS

Yeasts

Brewers yeast

31 Kara (BV), Simpson (WJ) and Hammond (JRM). Prediction of the fermentation performance of brewing yeast with the acidification power test. **Journal of the Institute of Brewing** 94(3); 1988; 153-158

A study on the use of acid power test to predict the time required to attenuate an all malt wort was conducted for **Saccharomyces cerevisiae** NCYC 1681 from OG 1041 to 1029 F. The acidifcation power test measures the ability of a population of yeast cells to maintain different intracellular and extracellular hydrogen ion concn when placed in distilled water. It also measures the change in these concn induced by the presence of glucose. The test is simple one and can be conducted using commonly available lab. equipments. It can be applied routinely in breweries and does not require secondary analysis for yeast selection based on the use of Reject Quality Limits. The test can also be applied for evaluation of yeast handling protocals in the assessment of new yeast strains of their condition prior to acid washing. NGM

Pachysolen tannophilus

32 Amin (G), Khallafalla (G) and Doelle (HW). Comparative study of D-xylose conversion to ethanol by immobilized growing or non-growing cells of the yeast **Pachysolen tannophilus**. **Applied Microbiology and Biotechnology** 27(4); 1988; 325-332

The direct conversion of D-xylose to ethanol was investigated using immobilized growing and non-growing cells of the yeast **Pachysolen tannophilus**. Both preparations produced ethanol from D-xylose, however the D-xylose conversion to ethanol was much better with immobilized growing cells. Ethanol concn up to 22.9 g/l and ethanol yield of 0.351 g/g of D-xylose were obtained in batch fermentation by immobilized growing cells whereas only 17.0 g/l and 0.308 g/g of D-xylose were obtained by immobilized non-growing cells. With continuous systems, immobilized growing cells were necessary for the long-term operation, since a steady state ethanol concn of 17.7 g/l was maintained for only one wk by immobilized non-growing cell reactor. With simultaneous control of aeration rate and concn of N sources in feed medium, immobilized growing cells of **P. tannophilus** showed excellent performance. At a residence time of 25 h, the immobilized cell reactor produced 26.9 g/l of ethanol from 65 g/l of D-xylose in feed medium. **AS**

Saccharomyces cerevisiae

33 Cameron (DR), Cooper (DG) and Neufeld (RJ). The Mannoprotein of Saccharomyces cerevisiae in an effective bioemulsifier. **Applied and Environmental Microbiology** 54(6); 1988; 1420-1425

Mannoprotein emulsified was extracted in high yield from whole cells of fresh bakers yeast by autoclaving in neutral buffer or by digestion with zymolase. The extracted material was purified by ultra filtration and contained approx. 44% carbohydrate (mannose) and 17% protein. Treatment of the mannoprotein with protease eliminated emulsifying property. RJ

34 Sturley (SL) and Young (TW). Chill proofing by a strain of Saccharomyces cerevisiae secreting proteolytic enzymes. **Journal of the Institute of Brewing** 94(3); 1988; 133-137

The attempted exploitation of a strain of yeast with extracellular proteases activity in the fermentation of brewers wort is described **S. cerevisiae** strain S01 was previously shown to secrete proteases with activity against a variety of substrates. It is shown here that these included some of the tannin precipitable proteins involved in the formation of chill haze in beer and consequently, more stable beers resulted from incubation with added YS01 cell-free culture supernatants. The proteases were also produced in an active form at low levels during fermentation of brewers wort using established commercial conditions. Concomitantly, a marginally more stable beer resulted. Respiratory deficient, auxotrophic rate-mating was used to transfer the extracellular proteolytic characteristic to a commercial easy to be solved and consequent to the different solving power and selectivity of the four products considered. Finally a model for a comparative study is presented, based on the use of GC analyses also in head space. AS

Preservatives

42 Botha (SJ) and Holzapfel (WH). Resistance of **Sporolactobacillus** to potassium sorbate and sodium nitrite. **International Journal of Food Microbiology** 5(4); 1987; 331-336

The resistance of **Sporolactobacillus** to different concn of potassium sorbate and sodium nitrite in autoclaved glucose yeast-extract peptone broth, pH 6.0 was determined. The min. inhibitory concn of potassium sorbate that completely inhibited outgrowth of endospores and vegetative growth of **Sporolactobacillus** inulinus ATCC 15538 was 4000 µg/ml and 5000 µg/ml, resp. For twelve isolates of **Sporolactobacillus** the av. min. inhibitory concn of potassium sorbate that completely inhibited outgrowth of endospores and vegetative growth were 5000 µg/ml and 7000 µg/ml, resp. Resistance of endospores of **Sporolactobacillus** to different sodium nitrite concn was high. Outgrowth of spores took place at sodium nitrite concn as high as 2000 µg/ml. AS

Antimicrobials

43 Bhatnagar (D) and McCormick (SP). The inhibitory effect of neem (**Azadirachta indica**) leaf extracts on aflatoxin synthesis in **Aspergillus parasiticus**. Journal of the **American Oil Chemists" Society** 65(7); 1988; 1166-1168

The effect of neem (**Azadirachta indica**) leaf extracts on **Aspergillus parasiticus** growth and aflatoxin biosynthesis was investigated. The extracts were prepared by blending 50 g (wet wt.) of fresh leaves in one l of 10 mM potassium phosphate (pH 7.0) or by boiling the leaves in the buffer. Extracts were added to fungal growth media at 1, 5, 10, 20 and 50% (vol/vol) concn prior to inoculation. The formulations did not affect fungal growth (i.e., mycelial dry wt.) but essentially blocked (> 98%) aflatoxin biosynthesis at concn greater than 10% (vol/vol). The inhibitory effect was somewhat diminished (60-70% inhibition) in heated leaf extracts. Volatile components of the extracts were analyzed using capillary gas chromatography/mass spectrometry; the major volatile component was 3-methyl 2-buten-1-ol. However, volatiles from blended leaf extracts did not affect either aflatoxin synthesis or fungal growth. The neem-mediated inhibition appears to involve regulation of secondary metabolism, because once secondary biosynthesis was initiated the inhibitory effect of the neem leaf constituents was lost. AS

44 Brackett (RE). Antimicrobial effect of chlorine on Listeria monocytogenes. Journal of Food Protection 50(12); 1987; 999-1003

The lethal effects of both reagent and household grade hypochlorite on Listeria monocytogenes were determined. The potential use of hypochlorite for removing **L. monocytogenes** from a vegetable, Brussels sprouts, was also evaluated. Results show hypochlorite appeared to have value in removing **L. monocytogenes** from water supply and equipment, but did not appear effective in removing the organism from contaminated vegetables. MVG

45 Corral (LG), Post (LS) and Montville (TJ). Antimicrobial activity of sodium bicarbonate. **Journal of Food Science** 53(3); 1988; 981-982

Sodium bicarbonate (SB) inhibited the growth of bacteria and yeasts in agar media model systems under certain conditions. **Escherichia coli, Lactobacillus plantarum, Staphylococcus aureus,** and **Pseudomonas aeruginosa** aerobic plate counts were reduced 100,000-fold by 0.12M (1% w/v) SB. **Saccharomyces cerevisiae** and **Hansenula wingei** were more sensitive, counts were reduced 100,000-fold by 0.06MSB. Potassium bicarbonate was equally inhibitory, but equimolar sodium chloride had no effect, ruling out osmotic and sodium mediated mechanisms of inhibition. The bicarbonate ion was identified as the probable cause of SB-mediated inhibition although, in some cases, pH elevation played a significant role. AS

Ethylene diaminetetraacetic acid

46 Kraniak (JM) and Shelef (LA). Effect of ethylene diaminetetraacetic acid (EDTA) and metal ions on growth of **Staphylococcus aureus** 196E in culture media. **Journal of Food Science** 53(3); 1988; 910-913

The effect of ethylene diaminetetraacetic acid (EDTA) and its salts, alone or in combination with Mg^{2+}, Fe^{2+}, Zn^{2+}, or Ca^{2+}, on growth of S. aureus strain 196E were studied. EDTA or its Na^{+} or K^{+} slats (0.8-1.7 mM), but not its Ca^{2+} or Fe^{2+} salts, inhibited cell growth in Brain Heart Infusion broth. Bacteriostatic effects in Casamino acids - Yeast Extract (CasY) broth were produced by 0.17 mM EDTA. Addition of Fe^{3+}, Zn^{2+}, or Ca^{2+} to EDTA containing broth eliminated inhibition at an EDTA-cation molar ratio of 1:1 while Mg^{2+} required a sevenfold concn Data suggest that EDTA exerts its inhibitory effect by chelating Ca and/or other essential cations which form complexes with comparable stability constants with EDTA. AS

Nitrites

47 McMindes (MK) and Siedler (AJ). Nitrite mode of action. Inhibition of yeast pyruvate decarboxylase (E.C. 4.1.1.1) and Clostridial pyruvate: Ferredoxin oxidoreductase (E.C. 1.2.7.1) by nitric oxide. **Journal of Food Science** 53(3); 1988; 917-919, 931

The effects of nitric oxide (NO) on the nonoxidative decarboxylation of pyruvate were studied using yeast pyruvate decarboxylase (PD) as a model. PD was inhibited by NO (50% inhibition @ 0.5 mM) under anaerobic but not under aerobic conditions. Prior inhibition by NO was not reversed by aerobic conditions. Sodium nitrite (0.5 mM) was not inhibitory. Inhibition of PD by NO was markedly enhanced in the presence of ascorbate. A preparation of pyruvate:ferredoxin oxidoreductase (PFO) from **Clostridium perfringens** (3624 A) was inhibited by

NO (50% inhibition 0.025 mM) but not by sodium nitrite (1.0 mM). These results suggest that the thiamin dependent decarboxylation of pyruvate may be an additional site for the antimicrobial mode of action of nitrite independent of the iron-sulphur center of PFO and supports the concept that the active principle is NO. AS

Sweeteners

Aspartame

48 Kishimoto (S) and Naruse (M). A process development for the bundling crystallization of aspartame. **Journal of Chemical Technology and Biotechnology** 43(1); 1988; 71-82

A crystallization process with a new crystalliser for obtaining bundle-like crystals of aspartame was developed for manufacturing practice. The process comprised of crystallisation without stirring, with a high concn. of aspartame so that the amount of precipitated solid after cooling was about 10 g $litre^{-1}$ or more, and with rapid cooling to produce high supersaturation. The pilot plant work was carried out in a 400-litre crystalliser and it was demonstrated that the process was technically possible and economically successful in large-scale manufacturing of aspartame. MVG

Fructose

49 Meincke (K). Fructose the natural sweetener with many advantages and characteristics. **Confectionery Production** 53(11); 1987; 772, 792

CEREALS

50 Munck (L), Rexen (F) and Haastrup (L). Cereal starches within the European community-Agricultural production, dry and wet milling and potential use in industry. **Starch/Starke** 40(3); 1988; 81-87

Of about 100 million t of starch produced in the European Community from cereals, about 3 million t is obtained as industrial starch. About 1 million t of starch is further obtained from potatoes. About half of the starch produced is used in non-food industries. However, there exist numerous other potential applications which have not yet been fully explored. A prerequisite for wider industrial application of starch is to improve its competetiveness vis a vis petroderived raw materials. Possibilities to bring about such situations have been discussed, e.g ., to breed an "industry-adapted" cereal crop with high content of starch of special quality. Grain yield has been found to be positively correlated with the starch content of cereal crop. Factors affecting the content of starch and its composition have also been discussed. SZA

Barley

51 Swanston (JS) and Taylor (K). The milling energy of malted barley and its relationship with hot water extract and Alpha-amylase activity. Journal of the Institute of Brewing 94(3); 1988; 143-146

A few winter and spring barley samples including breeder lines were tested for their malting quality with a view to develop a simple test based on milling of malt to predict the maltabilities of barley. Alpha-amylase activity of malt and hot water extract were the main criteria of malt quality. The hot water extract of samples gave a good correlation with milling energy of malt ($r=-0.921^{xxx}$) and a moderate relationship with grain milling energy ($r = 0.521^{xx}$). Hence, milling energy required for malted barley can be used as a test for predicting malting quality of breeder lines. NGM

Barley starch

52 MacDonald (AML) and Stark (JR). A critical examination of procedures for the isolation of barley starch. Journal of the Institute of Brewing 94(3); 1988; 125-132

A detailed investigation on the starch isolation from barley by wet grinding and satnetoluene deproteinisation was conducted. Light and scanning electron microscopic examination and Culter counter analysis before and after deproteinsation of the protein rich coloured layer on top of centrifuged suspensions of crude starch revealed presence of small starch granules. Discareting this layer results in loss of small starch granules. Hence, it is recommended that this top layer should be deproteinised by proteases and add back to main fraction to get representative starch. The article includes a good review of various laboratory scale starch isolation procedures and lists 49 relevent references. NGM

Rice

53 Chandrasekhar (PR) and Chattopadhyay (PK). Continuous rice puffing machine. Invention Intelligence 23(1); 1988; 35-36

The machine is designed to puff rice in a hot fluidized bed. The product thus produced in clean and hygienic. The technology is useful for village based cottage industry. BV

Rye

Rye flour

54 Kuhn (MC) and Grosch (W). Influence of the enzymatic modification of the nonstarchy polysaccharide fraction on the baking properties of reconstituted rye flour. Journal of Food Science 53(3); 1988; 889-895

Wheat

55 Wasowicz (E), Kaminski (E), Kollmannsberger (H), Nitz (S), Berger (RG) and Drawert (F). Volatile components of sound and musty wheat grains. **Chemie Mikrobiologie Technologie der Lebensmittel** 11(6); 1988; 161-168

The volatile components of wheat grains were isolated using standard-controlled simultaneous extraction/distillation, and were investigated using capillary gas chromatography and coupled gas chromatography-mass spectrometry (GC/MS). Two trace compounds exhibiting the typical, intensive musty odour of the microbially strongly contaminated wheat samples were enriched using two-dimensional GC, and identified as 2-methylisoborneol and geosmine using sniffing-GC/MS. BV

Wheat bran

56 Cadden (A-M). Application of response surface methodology (RSM) to the in vitro measurement of Bile salt binding under physiological conditions. **Journal of Food Science** 53(3); 1988; 947-953

Response surface methodology was used to assess the effects of adjusting incubation time, sample wt. and buffer pH on the in vitro measurements of sodium glycocholate binding by ground and unground AACC wheat bran. The degree of bile salt binding could be increased by increasing incubation time and by reducing buffer pH. Max. binding occurred if the sample wt. per incubation were approx. 200 mg. Reducing particle size slightly modified the effects of time and pH. Washing the wheat bran fibers with phosphate buffer reduced the total quantity of bile salts bound; however, response surface trends were not affected. AS

Wheat flour

57 Sosulski (FW), Nowa Kowski (DM) and Reichert (RD). Effects of attrition milling on air classification properties of hard wheat flours. **Starch/Starke** 40(3); 1988; 100-104

Effects of attrition milling on yield and composition of air-classified fractions from fifth break and first middling flours of hard red spring wheat were investigated using image analysis to characterize flour particle size distributions. Roller-milled flours had high proportions of particles < 45 µ m diameter but particles > 105 um diameter constituted most of the flour volume. Attrition milling caused less starch damage than pin milling but increased the degree of reduction (< 45 µ m diameter), based on vol., from 10.3 to 100% for fifth break and from 6.9 to 100% for first middling flours. Two cuts on the air-classifier produced a high protein fraction with high ash (30.5% protein, 41% starch, 2% ash, 14% moisture basis), which would have application as a gluten substitute in baking, and a medium protein fraction (14% protein, 66% starch, 0.65% ash) which could be blended into Bakers Patent. The major fraction of air-classified middlings flour contained 6.5% protein, 77% starch and 0.3% ash. AS

MILLETS

Corn

58 Stubblefield (RD), Greer (JI) and Shotwell (OL). Liquid chromatographic method for determination of citreoviridin in corn and rice. **Journal of the Association of Official Analytical Chemists** 71(4); 1988; 721-724

Citreoviridin, a neurotoxic mycotoxin, has been found as a natural contaminant in corn left unharvested in the Southeastern United States and in rice of several Asian countries, including Japan. A reliable analytical method for the quantitative detn. of citreoviridin in corn and rice is described. MNK

Corn starch

59 Chinnaswamy (R) and Hanna (MA). Optimum extrusion-cooking conditions for maximum expansion of corn starch. **Journal of Food Science** 53(3); 1988; 834-836, 840

Normal corn starch was extrusion-cooked in a C. W. Brabender Laboratory model single-screw extruder at various extruder barrel temp., screw speeds, feed rates, and moisture contents. The expansion ratios and shear strengths of the products were highly dependent on extrusion-cooking conditions. The max. expansion ratio of 16.1 was obtained when 14% moisture content (d.b.) starch was fed at a rate of 60 g min^{-1} with a screw speed of 150 r.p.m., a barrel temp. of 140 C and a die-nozzle L/D ratio of 3.1. The shear strengths of the extruded starch products were inversely proportional to the expansion ratios. AS

60 Eliasson (A-C), Finstad (H) and Ljunger (G). A study of starch-lipid interactions for some native and modified maize starches. **Starch/Starke** 40(3); 1988; 95-100

Starch-lipid interactions of 5 maize starches varying in amylose content and chemical modification were investigated by differential scanning calorimetry (DSC). The high-amylose maize starch gave the greatest endotherm due to the amylose lipid complex in presence of cetyl-trimethyl ammonium bromide (CTAB). This endotherm was decreased in an acetylated high-amylose maize starch, and the waxy var. did not give rise to such an endotherm. However when gelatinization enthalpies were compared, it was found that these values decreased also for waxy var. in the presence of CTAB. Dynamic rheological measurements showed that CTAB increased the storage modulus (G') for all the starches investigated, whereas saturated monoglycerides increased G' for normal maize starch, decreased G' for the cross linked waxy maize starch and left acetylated high-amylose maize starch unaffected. Lecithin and soybean oil either decreased G' or had no effect. AS

Sweet corn

61 McDaniel (MR), Montgomery (MW), Latham (D) and Lundahi (DS). Evaluation of high temperature-short time (HTST) blanched frozen sweet corn. **Journal of Food Science** 53(3); 1988; 760-764, 853

The effects of HTST blanching and steam blanching parameters on enzyme activities, moisture content, drip loss, shear force, sensory attributes, and consumer acceptability of frozen sweet corn were determined. Complete inactivation of catalase and peroxidase required HTST treatments of 60 psi and 75 psi, resp. Moisture content increased slightly and max. shear force decreased in the HTST blanched corn compared to the steam-blanched samples. Blanch pressures of 60 psi and 75 psi resulted in corn equivalent in sensory qualities of the steam-blanched product as judged by a trained panel. The 30 psi HTST blanch treatment was rated high in undesirable descriptors. Consumer tests resulted in no significant differences in acceptability across blanch pressure treatments and storage time. **AS**

PULSES

62 Chang (KC) and Harrold (RL). Changes in selected biochemical components, in vitro protein digestibility and amino acids in two bean cultivars during germination. **Journal of Food Science** 53(3); 1988; 783-787, 804

This study investigates changes in lectin and trypsin inhibitor activity, SDS-PAGE peptide pattern, **in vitro** protein digestibility and amino acid composition during germination of two dry bean cvs. Lectin activity in navy beans was reduced. Significant amounts of trypsin inhibitor activity in both navy and pinto beans remained after germination for 6 days. Glycopeptides, with mol. mass ranging from 25,000 to 27,000 daltons, from partial proteolysis of the major storage proteins were resistant to a multienzyme system. **In vitro** protein digestibility and amino acid composition were only slightly altered. Germination did not improve protein nutritional quality of dry beans. **AS**

63 Dutta (SK), Nema (VK) and Bhardwaj (RK). Physical properties of gram. **Journal of Agricultural Engineering Research** 39(4); 1988; 259-268

The effect of moisture content on physical properties of gram (**Cicer arietinum** L.) was studied. The grain samples of the desired moisture levels were prepared by rewetting and conditioning. At 10.9% moisture content d.b., 1000 grain wt. of the grain was 0.173 kg, which increased linearly with the moisture content, a mean surface area of 133.4 mm^2, and sphericity and roundness of the grain were 73.5 and 69.7% resp. In the moisture range from 9.64 to 31% d.b., bulk density varied from 780 to 708 Kg/M^3, kernel density from 1311 to 1257 kg/ M^3. porosity from 40.5 to 43.7% and static coeff. of friction from 0.384 to 0.651 over surfaces of different materials. The bulk and kernel densities were found to decrease linearly with increase in the moisture content where as the porosity and the static coeff. of friction increased linearly with the moisture content. The angle of repose was observed to change from 25.5 to 30.4 C in the moisture range from 8.62 to 17.6% d.b. The shape of the grain is concluded to be closest to a prolate spheroid. RS

64 Dutta (SK), Nema (VK) and Bhardwaj (RK). Thermal properties of gram. **Journal of Agricultural Engineering Research** 39(4); 1988; 269-275

65 Fleming (SE), Fitch (MD) and Stanley (DW). Influence of processing on physical form of beans and on intestinal fermentation. **Journal of Food Science** 53(3); 1988; 777-782

Three red kidney bean-containing diets and one fiber-free diet were fed to five Yucatan miniature swine to evaluate the influence of the physical form of a high-fibre food on fermentation in the gut. Beans were processed by three techniques prior to cooking; the conventional soak and autoclave procedure, a wet-milling technique, and a dry-milling technique. Breath gasses were collected from the animals and the concn of hydrogen and methane were determined to assess intestinal fermentation. Even though differences among the three bean preparations could be detected microscopically, these differences were not reflected in the physiological measurements since the extent of fermentation was similar for the free bean diets. AS

Cowpeas

66 Phillips (RD), Chinnan (MS), Branch (AL), Miller (J) and McWatters (KH). Effects of pretreatment on functional properties of cowpea meal. **Journal of Food Science** 53(3); 1988; 805-809

The efficiency of decorticating cowpeas was improved by hydrating to 25% then drying to -10% moisture. Effects of drying temp. (50, 70, 90, 110, 130 C) on functional and nutritional properties of cowpea meal were assessed. Extraction rate (yield) was unaffected by heating. Average particle size and water absorption of meal were greatest for intermediate temp. Starch was not gelatinized at any temp. Reduction in protein solubility, which occurred at temp. greater than or equal to 90 C, was associated with changes in gel electrophoresis patterns. Protein solubility was negatively correlated with previously reported values for sp. gr. and apparent viscosity of cowpea pastes. Increases in drying temp. reduced thiamin content and increased browning of the meal. AS

Lima beans

67 Meredith (FI), Thomas (CA), Snock (ME), Himmelsbach (DS) and Van Halbeek (H). Soluble carbohydrates oligosaccharides and starch in lima bean seeds. **Journal of Food Science** 53(3); 1988; 768-771

Seven genotypes of lima bean seeds at three maturity stages were analyzed by HPLC for the monosaccharide, fructose; the disaccharide, sucrose; the oligosaccharides, raffinose, stachyose, and verbascose; and the polysaccharide, starch. As maturity and size of the seeds increased, the concn of fructose and sucrose decreased while raffinose, stachyose and verbascose increased. No significant differences were found in the starch concn. The concn of the carbohydrates did not correlate with cotyledon colour, seed colour or growth habit. Sufficient variability existed in the oligosaccharide concn in the investigated genotypes that reduction of the flatulence promoters(raffinose, stachyose and verbascose) might be possible by breeding. AS

Pinto beans

68 Wang (CR), Chang (KC) and Grafton (K). Canning quality evaluation of pinto and navy beans. Journal of Food Science 53(3); 1988; 772-776.

Thermal processing of pinto and navy beans at 121.1 C for 16 or 14 min in a still retort gave similar sterilization value (F_0 =10) as the processing at 115.6 C for 45 min. The 121.1 C/16 or 14 min process produced beans with greater firmness than the 115.6 C/45 min process. The addition of CaCl and EDTA improved firmness and colour of canned beans. CaCl also reduced clumping and splitting of the canned beans. Sensory evaluation showed that the acceptability of canned beans was reduced when CaCl was increased up to 10 mM, light correlation between firmness and soluble pectin in various bean cvs implied that soluble pectin content could be used as a parameter for screening bean cvs with desirable firmness. AS

OILSEEDS AND NUTS

69 Prakash (V) and Narasinga Rao (MS). Structural similarities among the high molecular weight protein fractions of oilseeds. Journal of Biosciences 13(2); 1988; 171-180

In this report the similarity in amino acid composition, size and shape, mol. wt., secondary structure, subunit composition, association-dissociation at high and low pH, stability towards denaturants, hydrolysis by enzymes and quaternary structure of the high mol. wt. proteins (soybean, groundnut, sesame seed, sunflowerseed, safflower seed, mustard seed, rapeseed and cottonseed) is discussed. Based on these similarities a model has been proposed for the association-dissociation, denaturation and reassociation behaviour of the high mol. wt. proteins of oilseed. BV

Brazilnuts

70 Weckwerth (G). Radium accumulation in Brazilnuts. Gordian 87(9); 1987; 172-174 (De).

Rapeseeds

Rapeseed proteins

71 Paulson (AT) and Tung (MA). Emulsification properties of succinylated canola protein isolate. Journal of Food Science 53(3); 1988; 817-820, 825

Emulsification properties of unmodified and succinylated canola (rapeseed) protein isolate (54 and 84% modification of free amino groups) were examined over a wide range of pH values (pH 3.5-11.0) and sodium chloride concn. (0.0-0.70M). Both emulsification activity and emulsion stability were increased by succinylation, but extensive succinylation was not required to significantly improve these properties. Multiple regression analyses indicated that emulsification activity was related to protein solubility, hydrophobicity, zeta potential and flow behaviour of aqueous dispersions of the proteins. Emulsion stability was affected by protein solubility, zeta potential, apparent viscosity of protein dispersions and difference in density between the aqueous and oil phase. AS

72 Paulson (AT) and Tung (MA). Rheology and microstructure of succinylated canola protein isolate. Journal of Food Science 53(3); 1988; 821-825

Steady shear rheological properties of aqueous dispersions of unmodified and succinylated canola (rapeseed) protein (54 and 84% modification of free amino groups) were examined over a wide range of pH (3.5-11.0) and NaCl concn (0.0-0.70M). All dispersions were pseudoplastic and followed power-law or power-law plastic flow behavior. Apparent viscosity at shear rates of 10 and 1000 S^{-1} was affected by extent of succinylation, pH, NaCl concn and interactions among these factors. At both shear rates, protein solubility and hydrophobicity were reliable predictors of apparent viscosity. Dispersion microstructure, as revealed by light microscopy, appeared to play an important role in flow behavior. AS

Sesame

73 Fuknda (Y), Osawa (T), Kawagishi (S) and Namiki (M). Comparison of contents of sesamolin and lignan antioxidants in sesame seeds cultivated in Japan. Journal of Japanese Society of Food Science and Technology '(Nippon Shokuhin Kogyo Gakkaishi') 35(7); 1988; 483-486 (Ja).

The present work was intended to investigate the contents of sesamolin and lignan antioxidants in the sesame seeds of 14 domestic strains. Sesamolin was found to be rich in strain No. 638, 126, 48 and 201, but no apparent genetic or colour dependence of the contact was seen. At 5% significant level statistical analysis showed that the ratio of sesamin to sesamolin in black strains was larger than that in white strains. Lignan antioxidants and sesamol were found to be only in trace amounts in the 14 strains studied. BHSR

Soybeans

Soy proteins

74 Isobe (S) and Noguchi (A). Injection molding of soy protein. II. High moisture extrusion with twin screw extruder. **Journal of Japanese Society of Food Science and Technology '(Nippon Shokuhin Kogyo Gakkaishi')** 35(7); 1988; 471-479 (Ja).

An injection mold (250 mm x 50 mm) was designed for a twin screw extruder and examined at 0, 50, 150 C, for wet defatted soy flour (WDSF) to make a meat analogue and liberate its shape and size from restriction of die used to conventional extrusion cooking. WDSF showed the thermoplastic property and could be texturized to the same shape and size as the mold. Microscopic analysis revealed that the product had a well alligned fibrous fine outer layer and inside of the product were not so much different in all examined mold temp. The results suggest (1) the fibrous protein matrix is produced by the increasing shearing effect between the inner-wall of mold and the material when hot WDSF lava is extruded into the cooled mold. (2) the cooling die for wet protein extrution will have an upper limit of its opening mouth size. (3) the injection molding is one of promising method to make a large lump of meat analogue from WDSF regardless of its fine structure. AS

TUBERS AND VEGETABLES

Root vegetables

Beet

75 Pathak (L), Chang (KC) and Brown (G). Isolation and characterization of pectin in sugar-beet pulp. **Journal of Food Science** 53(3); 1988; 830-833

Pectin was extracted from sugar-beet pulp by various solvent fractionation procedures. An optimal HCl-extraction method yielded 19.53% pectin from the raw material. The HCl-isolated pectin contained 81.8% galacturonic acid. The sugar-beet pulp pectin obtained from different extraction procedures had a high methoxy content (greater than or equal to 60% degree of methylation). The pectin also contained 10 to 17.5% neutral sugars which were mainly arabinose and galactose as analyzed by gas chromatography. The peak mol. wt. (relative to dextrans) of the pectins as determined by gel permeation ranged from 35,500 to 44,700 daltons. The pectin possessed high water-holding capacity and low viscosity. AS

76 Wen (LF), Chang (KC), Brown (G) and Gallaher (DD). Isolation and characterization of hemicellulose and cellulose, from sugar beet pulp. **Journal of Food Science** 53(3); 1988; 826-829

Various conditions for the extraction of hemicellulose and cellulose from sugar beet pulp were examined, including pulp particle size, temp. of EDTA extraction, temp. and concn of alkaline extraction, and delignification time. A procedure using 60 mesh pulp 85 C EDTA extraction of pectins, 10% NaOH extraction at 25 C followed by one h delignification gave the highest yields. Mol. wt. of hemicellulose ranged from 40,000 to 150,000 daltons for the A form and 10,000 to 150,000 daltons for the B form. The monosaccharide composition of hemicellulose A and B differed significantly. Hemicellulose B had the highest water-holding capacity followed by hemicellulose A and cellulose. Viscosity of the hemicelluloses was very low. AS

Radish

77 Hashimoto (T) and Tatokoro (Y). Preservation of pickled radish with low salt content under anaerobic condition. Changes in microflora and constituents. **Journal of Japanese Society of Food Science and Technology '(Nippon Shokuhin Kogyo Gakkaishi')** 35(7); 1988; 480-482 (Ja).

Tubers

Cassava

78 Akinyosoye (FA), Fawole (MO) and Akinyanju (JA). Studies on the microbiology of the fermentation of cassava tuber for the production of an indigenous food. **Chemie Mikrobiologie Technologie der Lebensmittel** 11(6); 1988; 169-174

The microbiology of cassava tuber fermentation for the production of an indigenous food, **lafun** was investigated. A study of the microbial population of the rhizosphere, rhizoplane of the cassava tuber river water employed for steeping and the fermentation broth strongly suggests that the microorganisms responsible for cassava tuber fermentation have their origin mainly from the cassava tuber rhizosphere. A combination of bacteria and fungi in ordered succession appeared to be responsible for cassava fermentation into lafun. The implicated microorganisms were **Leuconostoc mesenteroides, Corynebacterium manihot, Lactobacillus plantarum, Micrococcus luteus** and **Geotrichum candidum**. The proper retting of cassava tuber for the production of lafun was found to require four days. The pH of the fermenting mixture declined with days of fermentation with a corresponding increase in the total titratable acidity. AS

79 Lalaguna (F) and Agudo (M). Lipid class of fresh cassava roots (**Manihot esculenta Crantz**) identification and quantification. **Journal of the American Oil Chemists" Society** 65(11); 1988; 1808-1811

The total lipid content was 0.2% fresh wt. and the polar lipids plus sterols and steryl esters constituted the major part of the total lipids. Seven phospholipids were identified phosphatidyl choline and phosphatidyl ethanol were in higher amounts. Among the six glycolipids, digalactosyl diacylglycerol and monogalactosyl diacylglycerol were the most abundant. MNK

Horseradish

80 Chang (BS), Park (KH) and Lund (DB). Thermal inactivation kinetics of horseradish peroxidase. Journal of Food Science 53(3); 1988; 920-923

Thermal inactivation of horseradish peroxidase (HRP) in buffer and sucrose solution was studied with Differential Scanning Calorimetry (DSC) and by determining residual activity. For both experimental systems, the apparent reaction order for thermal inactivation was 1.5. Since the four isozymes varied in heat-resistance, the 1.5 order was probably due to heterogeneity of HRP. An increase in the max. denaturation temp. by DSC as sucrose concn increased suggested that the addition of sucrose stabilized by enzyme against thermal denaturation. However, based on the detn. of residual activity, sucrose reduce thermal stability of HRP at 10-20% (w/w) and increased thermal stability when the concn was 40% or greater. At equimolar concn of fructose, glucose or lactose at 90 C, HRP was more rapidly inactivated than in the presence of sucrose. AS

Potatoes

81 Addo (C) and Augustin (J). Changes in the vitamin B-6 content in potatoes during storage. Journal of Food Science 53(3); 1988; 749-752

The nature of the repeatedly reported increase of vitamin B-6 in Russet Burbank potatoes stored for 30 days and 9 months was investigated. Potatoes contained pyridoxine, pyridoxamine, pyridoxal phosphate, and a pyridoxine glucoside. While pyridoxamine and pyridoxal phosphate concn remained unchanged, there was a sharp increase in pyridoxine glucoside during storage indicating a possible synthesis of vitamin B-6 during storage. In general, good agreement existed between data generated by microbial analysis and those obtained by the HPLC method. AS

82 Kozempel (MF). Modeling the kinetics of cooking and precooking potatoes. Journal of Food Science 53(3); 1988; 753-755

This research investigated the kinetics of cooking potatoes over the temp. range in which starch gelatinizes. A back extrusion texture test was used to measure cookedness. By correlating the data with that of other researchers using different texture tests and potato var., a unified model of cooking which is first order, independent of var., and applies to both cooking and gelatinization over the temp. range of 74 C to 100 C. AS

83 Mondy (NI) and Gosselin (B). Effect of peeling on total phenols, total glycoalkáloids, discolouration and flavour of cooked potatoes. Journal of Food Science 53(3); 1988; 756-759

The effect of peeling on the total phenols, total glycoalkaloids (TGA), discolouration, and flavour of 50-80g sized cooked potatoes was studied. Three methods of cooking were studied: (1) boiling in distilled water; (2) boiling in 16% NaCl solution; and (3) steaming. In all three methods, potatoes cooked without the peel were lower in phenolic and TGA content, discoloured less, and were less bitter than potatoes cooked with the peel. During cooking phenols migrated from the peel into both the cortex and internal tissues of the potato. Glycoalkaloids were less mobile than phenols and migrated only into the cortex. The movement of phenols and TGA into the cortex increased both discolouration and bitterness in potatoes cooked with the peel. AS

Vegetables

Cucumbers

Cucumber juices

84 Daeschel (MA), Fleming (HP) and McFeeters (RF). Mixed culture fermentation of cucumber juice with **Lactobacillus plantarum** and yeasts. **Journal of Food Science** 53(3); 1988; 862-864, 888

Saccharomyces cerevisiae and **Saccharomyces rosei** were tested for use in mixed culture fermentation of cucumber juice with **Lactobacillus plantarum**. Extent of sugar utilization and the ratio of products formed (lactic acid ethanol) were influenced by time of inoculation and cell numbers of each microorganisms. Sugar fermentation was complete within 6 days at 28 C when similar numbers of bacteria and yeasts were added simultaneously, or when yeasts were added before the bacteria. Sugar remained when only **L. plantarum** was added, or when yeasts were added in low numbers. Glycerol was produced when yeasts were present, the concn. being directly related to NaCl concn. Results suggest advantageous uses of yeasts to complete fermentation and to modify acidity. AS

Okra

85 Bryant (LA), Montecalvo (JJr), Morey (KS) and Loy (B). Processing, functional, and nutritional properties of okra seed products. **Journal of Food Science** 53(3); 1988; 810-816, 856

Okra full-fat flour, defatted flour, protein conc. and protein isolate were prepared from whole okra seeds (Spineless Green Velvet var.). Results of proximate analysis, amino acid profiles, in vitro protein digestibility, and calculated protein efficiency ratios (C-PER) indicated that okra products have significant potential as a viable new protein source. C-PER of okra products ranged from 2.16-2.22. Protein solubility indicated that these okra products were generally more soluble than commercial soy products. Emulsion capacity and viscosity of okra products were significantly lower than those for soy products. Overall, foam stability of soy products was consistently higher than that for okra products. AS

Tomatoes

86 Duden (R). A proposal on internal quality of tomatoes. **Gordian** 87(7/8); 1987; 146-147 (De).

A criteria for internal quality to be included in the official tomato quality standards is discussed. Tabulated data show the correlation of the refractometer value R with the taste value N(9-point scales). Using the regression equation N = R + 1.5, 3 quality grades are defined for N > 7, 6-7 and < 6, i.e. R > 5.5, 4.5 and < 4.5. BV

87 Yang (CC) and Chinnan (MS). Computer modeling of gas composition and colour development of tomatoes stored in polymeric film. **Journal of Food Science** 53(3); 1988; 869-872

A computer model was developed to predict changes in the gaseous environment (oxygen and carbon dioxide concn) of ripening tomatoes packaged in polymeric bags for a long period of storage. The gas model was then combined with the colour development model derived by the authors in a separate study to yield an integrated model. The integrated model was validated for two different wt. of tomatoes at the `turning' colour stage and stored in two types of films. AS

Tomato juices

88 Sadler (GD), Nelson (P) and Watabe (Y). A device for measuring oxygen solubility in fluids and oxygen permeation through polymers having fluid contact. **Journal of Food Science** 53(3); 1988; 977-978

An apparatus was developed which measured oxygen permeation from a gaseous environment into a liquid medium. Oxygen permeating the package material was detected in the liquid phase by an oxygen electrode. The oxygen permeation of 1 mil oriented polypropylene was 1417 cc/m^2- day at 25 C. Slopes of permeation lines were related to the oxygen solubility of various aqueous media. The oxygen solubility of an air-saturated 1.5% NaCl solution was 7.15 p.p.m. oxygen. Permeability and solubility values were both within 3% of known standards. The solubility method was used to determine the oxygen concn of air-saturated single-strength tomato juice. At 25 C, the sample contained 7.3 p.p.m. oxygen. AS

Tomato paste

89 Tan (B). Analytical and preparative chromatography of tomato paste carotenoids. **Journal of Food Science** 53(3); 1988; 954-959

Tomato paste carotenoids were separated by gradient-elution normal-phase open-column chromatography and analyzed by isocratic-elution reverse-phase HPLC with UV-VIS photodiode array detection. The normal-phase elution order of the trans pigments was phytoene, phytofluence, beta-, zeta-, gamma-carotene and lycopene. The four dominant tomato paste carotenoids (550 p.p.m.), in increasing quantities, were phytofluence, beta-carotene, phytoene and lycopene. Simultaneous multi-channel monitoring and rapid spectral scans allowed the detection of cis-isomers (e.g., lycopene, phytofluence and beta-carotene) and minor carotenoid components (e.g., alpha-carotene, lycoxanthin and cis-mutatoxanthin). Presentation of results in isograms (wavelength versus retention time) and an extraction scheme will be discussed. AS

FRUITS

90 Benk (E). Some lesser known wild fruits. **Gordian** 87(11); 1987; 226-227 (De).

Origin, botanical characterstics, sensory quality and uses of some wild fruits (**Sorbus torminalis**, **Vaccinium macrocarpum** (Cranberry), **Rubus chamaemorus**(Cloudberry), **Mahonia aquifolium**, **Sorbus aria**, **Prunus padus**, **Prunus avium**, **Malus purpurea**, **Chaenomeles japonica**(Japanese quince), and **Cotoneaster integerrimus** are described. BV

91 Benk (E). Some lesser-known exotic fruits. **Gordian** 87(7/8); 1987; 148 (De).

The geographical and botanical origin, properties, chem. comp. and uses of 10 tropical and subtropical fruits are briefly described. The fruits covered include bael fruit, icaco plum (**Chrysobalanus icaco**), safford (**Annona diversifolia**), Japanese gooseberry (**Actinidia arguta**), madrono (**Rheedia acuminata**), marula plum (**Sclerocarya biroea**), Chinese tree strawberry (**Myrica rubra**), sycomore fig, Roxburgh rose (**Rosa roxburghii**) and ugli fruit. BV

92 Floros (JD) and Chinnan (MS). Microstructural changes during steam peeling of fruits and vegetables. **Journal of Food Science** 53(3); 1988; 849-853

Microstructural changes of the fruit tissue during a steam-peeling process were studied and critically evaluated using pimiento pepper (**Capsicum annum** L. cv. Truhart) as a model commodity. The high temp. of the steam resulted in melting and reorganization (phase transition) of the cuticular waxes on the surface of the fruit. Heat transfer increased the temp. inside the fruit, which in turn caused vaporization of the cell fluids, increased internal pressure, occurrence of various biochemical reactions (hydrolysis of carbohydrates, breakdown of pectins) and finally rupture of cell walls and separation of the skin. A possible mechanism of peeling is discussed and a multistage peeling process is introduced to improve product yields and reduce peeling losses. AS

93 Manabe (M), Naohara (J), Sata (T) and Okada (J). The extraction of pectin by microwave heating. **Journal of Japanese Society of Food Science and Technology '(Nippon Shokuhin Kogyo Gakkaishi')** 35(7); 1988; 497-501 (Ja).

Pectin extracted with 0.05 N hydrochloric acid from the pulp of satsuma mandarin (Citrus unshi MARC) and apple fruit **Malvs pumila** MILLER var. domestica SCHNEIDER), the extraction time by microwave heating and was considerably less as compared with the ordinary method by water bath at 85 C. The content of pectin extracted by microwave heating was higher than that of pectin extracted by water bath. Galacturonic acid content, degree of esterification relative viscosity of pectin prepared from the pulp of citrus and apple fruit were both decreased according to the increase of extraction time. BV

Apples

94 Lee (HS) and Wrolstad (RE). Stable isotopic carbon composition of apples and their subfractions-Juice, seeds, sugars, and non-volatile acids. **Journal of the Association of Official Analytical Chemists** 71(4); 1988; 795-797

The ^{13}C: ^{12}C ratios of 8 authentic apple juice samples and their subfractions were determined by mass spectrometry. Apples from Argentina, Mexico, New Zealand, and the United States were processed into juice; pulp was collected from the milled fruit and seeds were collected from the press-cake. Sugars, non-volatile acids, and phenolics were isolated from the juice by treatment with ion-exchange resins and polyvinylpyrrolidone (PVPP). The mean value for all juice samples was -24.2% which is close to the values reported by other investigators. Juice from apples grown in Argentina, Mexico, and New Zealand did not differ from U.S. samples. The isotopic composition of the subfractions ranged from -22.0 to 31.0%. The values for the pulp were essentially the same as for juice. The sugar fraction was slightly less negative than the juice; the nonvolatile acid and phenolic fractions were more negative. The levels of nonvolatile acids and phenolics in apple juice are low, however, so these compounds contribute little to overall Delta ^{13}C values in juice. AS

Avocadoes

95 Zauberman (G), Fuchs (Y), Yanko (U) and Akerman (M). Response of mature avocado fruit to postharvest ethylene treatment applied immediately after harvest. **HortScience** 23(3); 1988; 588-589

Ripening of mature avocado fruit was accelerated by 18- and 24-h ethylene treatments which were applied beginning 1 h after harvest. Exposure to ethylene for 12 h or less, starting 1 h after harvest, did not accelerate the respiration rate, ethylene evolution, or fruit softening. Ethylene treatment for 6 h starting at 1, 6, 12, or 18 h after harvest did not accelerate the onset of the ripening process. It is suggested that ethylene does not just "trigger" the ripening of avocado fruit but rather is involved in a relatively long (18 to 24 h) process which requires its continuous presence. AS

Citrus fruits

96 Ifuku (Y), Maeda (H) and Yamazaki (S). Recent technology in the Japanese citrus processing industry. **Food Technology** 42(7); 1988; 105-108

The Application of new technology for improvement of citrus beverage production in Japan is discussed in this article. Covers aseptic filling system and resin adsorption (removal of acid and bitterness, removal of hesperidin and removal of off flavours). BV

Qunice

97 Lesinska (E), Przybylski (R) and Michael Eskin (NA). Some volatile and nonvolatile flavour components of the dwarf qunice **Chaenomeles japanica**). **Journal of Food Science** 53(3); 1988; 854-856

Volatiles obtained from distillation of Dwarf quince (**Chaenomeles japanica**) were analyzed by gas chromatography-mass spectrometry. Twenty-one compounds including 7 esters, 7 alcohols, 4 terpenes and 3 miscellaneous were identified. In addition, 2 nonvolatile sugar alcohols, mannitol (16.4% of the total) and sorbitol (30% of the total), were also identified. Aromagrams indicated that esters and alcohols contributed to the fruity flavour of Dwarf quince. AS

CONFECTIONERY, STARCH AND SUGAR

Confectionery

98 Benk (E). Fruit pastes. **Gordian** 86(5); 1987; 89-90 (De).

Discusses production, composition and evaluation of fruit pastes (eg quince 'cheese') in the light of the relevant literature and regulations for confectionery products, the Food and Commodities Law and Labelling regulations. BV

Starch

99 Chang (S-M). Characterization of starch from **Sagittaria trifolia** L. Var. **sinensis** Makino. **Journal of Food Science** 53(3); 1988; 837-840

The physicochemical properties of starch from the corm of **Sagittaria trifolia** L. var. sinensis Makino (arrowhead) were investigated. The starch contained 31.65% of amylose and 0.0897 mg/g of phosphorus. It has a gelatinization temp. range of 56.1-61.7-64.9 C, a mixed type of Brabender viscosity pattern, a one-stage swelling pattern, 99.6% water-binding capacity, low solubility in dimethyl sulphoxide, and high alpha-amylase susceptibility. The amylose was found to be a branched mol. of DP 2202 and was hydrolyzed 86.6% with Beta-amylase. Its amylopectin had an av. chain length of 24.5 and was hydrolyzed 65.5% with Beta-amylase. The characteristics of this starch were different from those of typical corm, bulb and tuber starches. AS

100 Przybt (M) and Sugier (H). The properties of glucoamylase soluble and immobilized on DEAE-cellulose. Part I. Kinetics and thermodynamics of enzyme reaction. **Starch/Starke** 40(3); 1988; 108-111

Kinetics of starch and maltose hydrolysis by glucoamylase solubilized and adsorbed on DEAE-cellulose were studied. The immobilization of enzyme as well as an increase in the amount of adsorbed enzyme caused an increase in the K_M and a decrease in the V_{max} values, explained partially due to diffusion limitation and steric hindrances. The soluble enzyme was inhibited by starch as substrate with inhibition constants of $K_S = 761$ dm . SZA

Polysaccharides

101 Englyst (HN) and Cummings (JH). Improved method for measurement of dietary fiber as non-starch polysaccharides in plant foods. **Journal of the Association of Official Analytical Chemists** 71(4); 1988; 808-814

A method is described that allows rapid estimation of total, soluble, and insoluble dietary fiber as the non-starch polysaccharides (NSP) in plant foods. It is a modification of an earlier, more complex procedure. Starch is completely removed enzymatically, and NSP is measured as the sum of its constituent sugars released by acid hydrolysis. The sugars may, in turn, be measured by gas chromatography (GC), giving values for individual monosaccharides, or more rapidly by colorimetry. Both GC and colorimetry are suitable for routine measurement of total, soluble, and insoluble dietary fiber in cereals, fruits and vegetables. Values obtained are not affected by food processing so the dietary fiber content of various processed foods and mixed diets can be calculated simply from knowing the amount in the raw materials. The additional information obtained by GC analysis is valuable in the interpretation of physiological studies and in epidemiology where disease is related to type and amount of dietary fiber. AS

Sugar

Sucrose

102 Chinachot (P) and Steinberg (MP). Interaction of sucrose with gelatin, egg albumin and gluten in freeze-dried mixtures as shown by water sorption. **Journal of Food Science** 53(3); 1988; 932-934, 939

The objective was to study sucrose-protein interactions in freeze-dried mixtures as shown by water binding data. Gelatin, egg albumin and gluten were included. Sucrose content was varied. Each samples was mixed with water and dried. The powder was equilibrated against known water activity ranging from 0.58 to 0.93. The experimental water sorption data at a given water activity was then compared to calculated values obtained from the Lang-Steinberg mass balance equation. Contrary to other systems, samples sorbed more rather than less water than calculated. This was ascribed to sucrose-protein interaction which increased water binding by protein. Amount of interaction at a given water activity was found to be lineraly related to the sucrose content. A critical sucrose content was needed to trigger the interaction. AS

BAKERY PRODUCTS

Tortillas

103 Gonzalerz-Agramon (M) and Serna-Saldivar (SO). Effect of defatted soybean and soybean isolate fortification on the nutritional, physical, chemical and sensory properties of wheat flour tortillas. Journal of Food Science 53(3); 1988; 793-797

Wheat flour fortified with 11.1% defatted soybean meal (SBM) or 5.6% soybean isolate (SBI) was processed into flour tortillas. Fortified tortillas contained 35% more protein and twice as much lysine as the 100% wheat flour tortilla. Addition of SBM or SBI decreased dough elasticity but increased dough water absorption and the force required to stretch the dough. The SBM fortified tortilla had better texture ($P < 0.05$) than the 100% wheat flour tortilla and similar flavour and colour ($P > 0.05$). Rats fed fortified tortillas gained three times as much wt. and doubled the protein efficiency ratio (PER) when compared to rats fed wheat flour tortillas. The apparent biological and net protein utilization values of the fortified tortillas were similar ($P > 0.05$) and higher ($P < 0.05$) than the wheat flour tortilla. The SBI fortified tortilla had a higher apparent protein digestibility ($P < 0.05$) than the 100% wheat flour and SBM fortified tortillas. AS

MILK AND DAIRY PRODUCTS

104 Ferreira (CL) and Gilliland (SE). Bacteriocin involved in premature death of **Lactobacillus acidophilus** NCFM during growth at pH 6. Journal of Dairy Science 71(2); 1988; 306-315

Lactobacillus acidophilus NCFM maintained at pH 6 during growth in lactobacilli MRS broth appeared to exhibit premature death. However, during extended incubation, the culture reinitiated growth. Spent broth collected from the culture when it began the premature death was very toxic to the culture, but growth did occur during extended incubation of the assay tubes. When several successive subcultures with extended incubation were made in MRS broth containing added inhibitory spent broth, a strain (identified as **L. acidophilus**) was isolated that was resistant to the inhibitor. This strain produced a bacteriocin that was inhibitory to the growth of **L. acidophilus** NCFM and the predominating strains isolated from it. The producer strain grew more slowly than did the predominating strains in culture NCFM. The results show that when **L. acidophilus** NCFM, a mixed strain culture, was grown at pH 6, the inhibitory strain was able to grow sufficiently to produce enough bacteriocin to destroy the predominating strain(s) in the culture. AS

105 Froseth (BR), Harlander (SK) and Mckay (LL). Plasmid-mediated reduced phage sensitivity in **Streptococcus lactis** KR5. Journal of Dairy Science 71(2); 1988; 275-284

The phage insensitivity of Streptococcus lactis KR5 was evaluated for its possible linkage to plasmid DNA. This strain possessed plasmids of 40, 29, 26, 21, 16.5, 10.5, 7.8 and 1.5 Mdal. Plasmid curing using novobiocin resulted in derivatives with increased sensitivity to prolate-headed phage, suggesting the involvement of plasmid DNA in phage insensitivity. Transformation of S. lactis LM0230 protoplasts with the KR 5 plasmid DNA pool produced transformants containing a plasmid of about 27 Mdal. These erythromycin-resistant transformants were lactose-positive phage sensitive or were lactose-negative and exhibited a reduced sensitivity to phage. Agarose gel electrophoresis and restriction endonuclease digestion analysis showed the 27-Mdal plasmid band to be composed of two distinct plasmids of 26 Mdal (pBF61) and 29 Mdal (pBF62), which coded for reduced phage sensitivity and lactose-positive phenotypes, resp. The mechanisms of reduced phage sensitivity encoded by pBF61 included a restriction/modification system and a mechanism that resulted in reduced plaque size independent of incubation temp. These results further support the involvement of plasmid DNA in the mechanisms for reduced phage sensitivity in dairy streptococci. AS

106 Kosikowsk (FV). Enzyme behavior and utilization in dairy technology. **Journal of Dairy Science 71(3); 1988; 557-571**

Reviews a brief history and uses of enzymes in dairy industry. Uses & limitations of lactoperoxidase, lysozyme, lactase, protease, chymosin, alkaline and acid phosphatases and genetically engineered enzymes are described. Possibility of using penicillinase as an indicator of contamination by spoilage bacteria on cheese surface is also indicated. JSS

107 Olieman (C) and de Vries (ES). Determination of D- and L-lactic acid in fermented dairy products with HPLC. **Netherlands Milk and Dairy Journal 42(2); 1988; 111-120**

Milk

108 Arul (J), Boudreau (A), Makloug (J), Tardoj (R) and Grenier (B). Distribution of cholesterol in milk fat fractions. **Journal of Dairy Research 55(3); 1988; 361-371**

Milk fat was fractionated into liquid (m.p. = 12 C), intermediate (m.p. = 21 C) and solid (m.p. = 39 C) fractions by three different processes melt crystallization, short-path distillation and supercritical carbon dioxide extraction and the cholesterol content of these fractions determined. Cholesterol was enriched in the liquid fractions from all three processes, in particular about 80% of the cholesterol being found in the liquid fraction obtained by short-path distillation. The basis of migration of cholesterol into various milk fat fractions was explained by its affinity to various triglycerides (melt crystallization) and by vapour pressure and mol. wt. (short path distillation). It was more complex in the supercritical carbon dioxide extraction process; the interplay of cholesterol affinity toward carbon dioxide and its molar volume, and its vapour pressure enhancement under applied pressure play a role. AS

109 Blanco (JL), Dominguez (L), Gomez-Lucia (E), Garayzabal (JFF), Garcia (JA) and Suarez (G). Presence of aflatoxin M1 in commercial ultra-high-temperature treated milk. **Applied and Environmental Microbiology** 54(6); 1988; 1622-1623

Forty seven samples of commercial ultra-high-temp. treated milk from a dairy facility in the Northwest part of Spain were analyzed for the presence of aflatoxin M1. A total of 14 samples (29.8%) were positive for aflatoxin; 4 in May, 3 in November, 3 in December, 1 in January, 1 in April, 1 in July and 1 in August), 29 (61.7%) were negative and 4 (8.5%) were doubtful i.e. they showed trace quantities of aflatoxin M1. The range of aflatoxin M1 content was 0.02 to 0.1 ng/ml. RJ

110 Bucky (AR), Hayes (PR) and Robinson (DS). Enhanced inactivation of bacterial lipases and proteinases in whole milk by a modified ultra high temperature treatment. **Journal of Dairy Research** 55(3); 1988; 373-380

Cultures of **Pseudomonas** spp. strains P10, P12, and P15 grown in whole milk which contained -1 x 10^8 viable bacteria ml^{-1} demonstrated near linear increases in the concn of short chain free fatty acids and trichloroacetic acid soluble free amino groups at 20 C, following either ultra-high temp. (UHT) treatment (140 C for 5 s) or dual heat treatments (140 C followed by either 57, 60 or 65 C). The dual heat treatments reduced the rates of lipolysis and proteolysis compared to the UHT treatment by up to 25 fold. The dual heat treatment utilising 60 C for 5 min also effectively limited both lipase and proteinase activities in raw milk culture samples which had contained either 6 x 10^6, 5 x 10^7 or 1 x 10^8 viable bacteria ml^{-1}. In this system enzyme activities were reduced by up to 10-fold following dual heat treatment compared to UHT treatment alone. Commercial raw milk samples were used to confirm the pure culture studies, since such milks would contain a range of bacterial lipases and proteinases, presumably with variable thermostabilities. MCV

111 Corzo (N), Ramos (M), Olano (A), Calvo (MM), Amigo (L) and Martinez-Castro (I). Effect of storage on changes of carbohydrate and protein fractions of milks submitted to different thermal treatments. **Chemie Mikrobiologie Technologie der Lebensmittel** 11(6); 1988; 175-180

Changes on carbohydrate and protein fractions during storage at room temp. of commercial UHT and sterilized milk samples were studied. Degradation of caseins was observed by polyacrylamide gel electrophoresis (PAGE). Whey protein fraction showed a marked denaturation for in-container sterilized milk, appearing a band migrating in PAGE between seroalbumin and Alpha-lactalbumin. This band remained unaltered during storage. Clear distinction can be made between milk samples according to the lactulose content (22, 63, and 142 mg/100 mL in directly UHT, indirectly UHT and sterilized milk, resp.). No significant changes on lactulose content were observed during storage of UHT milk samples. In sterilized samples the lactulose content increased by approx. 20%. AS

112 Fox (JR), Duthie (AH) and Wulff (S). Precision and sensitivity of a test for vegetable fat adulteration of milk fat. **Journal of Dairy Science** 71(3); 1988; 574-581

Vermont test is evaluated for detection of adulteration in milk fat. Soybean oils, partially hydrogenated soybean oils, and coconut oils are used as adulterants in the experiment. Postassium salts of fatty acids are prepared by soapenification in the presence of isopropyl alcohol. Salts of fatty acids are injected into a glass capillary of GLC apparatus at 250 C. The k salts are broken with the help of formic acid fumes suitably injected to saturate the carrier gas. The test was found suitable for detecting adulteration of less than 10% of partially hydrogenated vegetable oils like soybean oil. However the test may not be suitable for detecting adulteration of ghee with coconut palm kernel oils. For the detection of adulteration C_4 : $C_{18:1}$ ratio has been utilized. JSS

113 Hill (AR). Quality of ultra-high temperature processed milk. **Food Technology** 42(9); 1988; 92-97

This article is a review of the biochemical and physicochemical aspects which relate to the problems of flavour and keeping quality of ultra-high-temp. processed milk. GAR

114 Isshiki (H), Suzuki (Y), Yonekubo (A), Hasegawa (H) and Yamamoto (Y). Determination of phylloquinone and menaquinone in human milk using high performance liquid chromatography. **Journal of Dairy Science** 71(3); 1988; 627-632

115 Kessler (HG). Dairy technology. Heat treatment of milk. **Industrie Alimentari** 27(256); 1988; 15-18 (It).

116 Kleyn (DH), Trout (JR) and Weber (M). Determination of fat in raw-milk. Comparison of Mojonnier (ether extraction) and Gerber method. **Journal of the Association of Official Analytical Chemists** 71(4); 1988; 851-853

Results are compared for the approved Gerber method that specifies a TC 11.07 mL pipet and 2 modifications that specify a TC 10.77 mL pipet or a weighed 11.125 g sample of milk rather than a pipetted sample. All results were also compared with results obtained with the Mojonnier method for determining the fat content of raw milk. The standard deviation is somewhat lower for the Mojonnier method than for any of the Gerber methods; among the Gerber methods, the standard deviations were lower for the TC 10.77 mL and 11.125 g modifications. It is recommended that one of these modifications replace the current specified TC 11.07 mL pipet method. AS

117 Koops (J), Klomp (H) and Westerbeek (D). The cadmium and lead contents of Dutch milk. Comparison of the results obtained by Zeeman-corrected, stabilized-temperature platforms furnace atomic absorption spectroscopy and differential pulse anodic tripping voltammetry. A

reassessment. **Netherlands Milk and Dairy Journal** 42(2); 1988; 99-110

The details of two methods of detn. of Cd and Pb in milk have been presented in this paper. The first method is based on direct analysis of milk by Zeeman-corrected stabilized temp. platform furnace AAS (ZSTPFAAS). The second method involves detn. of these elements by differential pulse anodic stripping voltametry (DPASV). The results showed that cartoned standardised whole milk (35% fat), from various parts of the Netherlands contained 0.02-0.06 ug/Cd/L (average: 0.03 µg/L) and 1-4 µg/Pb/L (average 2.4 µg/L). It was found that values obtained with ZSTPFAAS and DPASV were of the same level and they were lower than previously determined by Graphite furnace atomic absorption spectroscopic method. NGKR

118 Koops (J), Westerbeek (D), Kerkhof Mogot (MF) and Wullink (DM). Calibration of loops used in the enumeration of bacteria in milk. Comparison of amidoblack, lithium chloride and radioactive phosphate methods. **Netherlands Milk and Dairy Journal** 42(2); 1988; 85-97

In the present paper details are given of three calibration procedures for loops in use for the enumeration of bacteria in milk. After addition of amidoblack, lithium chloride or radioactive phosphate to milk, the actual vol. of milk, mechanically transferred by loops, can be determined by mol. absorption spectrometry, flame-emission spectroscopy or by radioactivity measurements. Changes in viscosity and/or surface tension of the milk were recorded. Calibration by the amidoblack method (Ab) leads to loop vol. which are significantly higher than those obtained by the lithium (Li) and radioactivity method (^{32}P), due to considerable changes in the above mentioned physical parameters. The loop calibration data derived from Li and ^{32}P did not differ statistically. Addition of 10% water to milk did not affect loop vol. The effect of the temp. of the milk amounts to 0.01 µ l/ C for an average loop vol. of 1.866 µ at 5 C. A straight forward calibration is possible by direct measurement of transferred calcium, potassium or sodium to water. AS

119 Kwak (HS) and Jeon (IJ). Comparison of high performance liquid chromatography and enzymatic method for the measurement of lactose in milk. **Journal of Food Science** 53(3); 1988; 975-976

A high performance liquid chromatographic (HPLC) procedure was compared with an enzymatic method for the measurement of lactose in milk. A new rapid HPLC sample preparation technique was used for precipitating milk proteins with 2-propanol. Results indicated that lactose detected in milk (expressed as percentage) was consistently lower with the enzymatic method than the HPLC procedure. Mean difference between the two methods was 0.15% with a range of 0.04 to 0.51. Coeff. of variability for the HPLC and enzymatic methods were 1.02 and 2.75, resp. Recovery of added lactose in milk by HPLC was 100.3% for whole milk, 97.1% for low fat milk, and 99.5% for skim milk. AS

120 Mahoney (RR) and Wilder (T). Thermostability of yeast lactase (Kluyveromyces marxianus) in milk. **Journal of Dairy Research** 55(3); 1988; 423-433

The half-life (-2 h) of commercial yeast lactase (**Kluyveromyces marxianus**) in milk at 45 C was 20 times greater than in milk salts and 50 times greater than in phosphate buffer. K was a more effective stabilizer than Na, both in milk salts and buffer. Stability was markedly reduced by the absence of divalent cations. Lactose and casinate both stabilized the enzyme about 5-fold in milk salts, but together they stabilized it almost 50-fold. At equimolar concn., galactose was almost as effective as lactose as a stabilizer, but glucose was much less effective and sucrose had no effect. Stability in milk was independent of enzyme concn., but varied with concn. of milk solids, reaching a max. at about 25% solids. In milk, enzyme denaturation was more sensitive to changes in temp. in the range 42-53 C than in the range 30-40 C. At a concn of 10 O-nitrophenyl-Beta-D-galactopyranoside units/ml it took 19 min at 45 C to achieve 80% hydrolysis of lactose in milk, compared to 87 min at 30 C. AS

121 McAllister (JS), Ramos (MS) and Fox (TL). Evaluation of the 3M dry medium culture plate (petrifilm^{TM}SM) method for enumerating bacteria in processed fluid milk samples. **Dairy and Food Sanitation** 7(12); 1987; 632-635

122 Mohamed (MO), May (AT) and Morris (HA). Effect of pH, calcium chloride and soy protein on (Ca) in reconstituted non-fat, dry milk and on rennet-induced coagulum properties. **Journal of Food Science** 53(3); 1988; 798-804

Increasing CaCl and lowering pH caused a significant increase in (Ca^{2+}) in reconstituted non-fat dry milk (RNDM), while the addition of soy protein caused a significant reduction in Ca^{2+} Lowering pH greatly increased rennet-induced coagulum firmness in RNDM and slightly increased it in RNDM-soy protein mixtures. Added CaCl increased coagulum textural parameters and syneresis in both systems. The extent to which these properties were increased was higher in RNDM than in the coagulum containing soy protein depending on the time after rennet addition and the amount of CaCl added. The first increment of CaCl added had the highest effect in improving textural properties and increasing syneresis. AS

123 Mohamed (MO) and Morris (HA). Effects of enzyme modified soy protein on rennet-induced reconstituted non-fat dry milk coagulum properties. **Journal of Food Science** 53(3); 1988; 788-792, 809

Soy protein was hydrolyzed by trypsin, pepsin and Alpha-chymotrypsin. Effects of adding hydrolyzed soy protein on rennet-induced nonfat milk coagulum texture and syneresis were studied. Pepsin-modified soy protein increased coagulum firmness and syneresis grater than untreated soy protein. Soy protein hydrolyzed with trypsin for 150 min and added to non-fat milk increased coagulum firmness greater than non-fat milk with no soy protein added. Chymotrypsin-modified soy protein acted similarly to the trypsin modified soy protein except the coagulum firmness was less than non-fat milk alone. Soy protein hydrolyzed by trypsin followed by pepsin increased coagulum firmness more than hydrolysis by a single enzyme and was close to non-fat milk without soy protein. AS

124 Ng-Kwai-Hang (KF), Moxley (JE) and Van de Voort (FR). Factors affecting differences in milk fat test obtained by Babcock, Rose-Gottlieb, and infrared methods and in protein test from infrared milk analysis. **Journal of Dairy Science** 71(2); 1988; 290-298

125 Sanjose (C), Fernandez (L) and Palacios (P). Compositional changes in cold raw milk supporting growth of **Pseudomonas fluorescens** NCDO 2085 before production of extracellular proteinase. **Journal of Food Protection** 50(12); 1987; 1004-1008

Effort has been made to identify the sequence of different substrates present in milk, during growth at 7 C of a typical psychrotropic strain, **Pseudomonas fluorescens**, always in reference to production of its extracellular proteinases. Results showed that glucose and lactate were depleted from milk, pyruvate and guconate were significantly diminished, but citrate was mostly unused when proteinate was first detected by the powder Azure assay, the psychrotropic count being around 10 CFU/ml. At that stage, ammonia, ammonia and short peptides had just started to increase in levels and only 20% of the original urea had been consumed. A procedure to anticipate, in cold stored raw milk batches the time for production of extracellular proteinase on the basis of sensitive lactate and ammonia detn. is suggested. MVG

126 Senyk (GF), Goodall (C), Kowzlowski (SM) and Bandler (DK). Selection of tests for monitoring the bacteriological quality of refrigerated raw milk supplies. **Journal of Dairy Science** 71(3); 1988; 613-619

Ten raw milk samples from different producers were stored at 1.7, 4.4, 7.2 and 10.0 C. The incubation period was 24 and 48 h. Method tested were standard plate count psychrotrophic bacterial plate count, rapid psychrotrophic count, preliminary incubation count, mesophilic plate count. Lab. pasteurized count, coliform count by violet Red Bile Agar techniques. Impedance protocols on Bactometer for total count, psychrotrophic count, mesophilic count and coliform count. The counting techniques were compared using nonparametric statistics. Impedance measurements provided information in min time. Standard plate count method was used as a reference method. JSS.

127 Seymour (EH), Jones (GM) and McGillard (ML). Comparisons of on-farm screening tests for detection of antibiotic residues. **Journal of Dairy Science** 71(2); 1988; 539-544

A study was conducted to determine the accuracy of the two on-farm residue tests, the Delvotest-P and the Penzyme test, in comparison with the **Bacillus stearothermophilus** disc assay, recognised by FDA and to examine the merit of Live Animal Swab Test (LAST) on urine as a detection screen for antibiotic residues in slaughter dairy cattle. Composite milk samples (n =122) were taken from 58 cows receiving antibiotic treatment with a single antibiotic by any route of administration. Samples were obtained 72 h post treatment and sampling continued every 24 h until all residue tests showed a negative result for antibiotics. Urine of cull cows was collected and tested for residues with LAST for antibiotic residues present in slaughter carcasses. No significant difference was found between the **Bacillus stearothermophilus** disc assay and either on-farm test. Chi-square analysis indicated that with both the Delvotest and the Penzyme test, 17% of samples gave positive results when the disc assay showed negative readings. An inordinately high percentage (69%) of urine samples from cull cows exhibited antibiotic contamination, although all animals had completed the specified withholding periods. Fifteen of these positive results were obtained from primiparous cows that had never been treated with any antibiotics. Results from the LAST on urine show a high percentage of false positive results. MCV

128 Vonk (AD), Schaasfsma (G), Dekker (PR) and de Waard (H). Relationship between intestinal transit time and Fe absorption from milk and yoghurt in rats. **Netherlands Milk and Dairy Journal** 42(2); 1988; 147-154

This investigation was carried out to find out whether the difference in Fe absorption from milk and yoghurt is due to intestinal transit time. Four groups of young male Wistar rats each consisting of six animals were fed ad libitum diets based on milk or yoghurt for three weeks: Ferrous sulphate and Ferrous tartrate were used as the Fe supplements. The results revealed that rats fed yoghurt showed a slightly but significantly lower intestinal iron absorption and lower blood values for haemoglobin and haematocrit than those fed milk whereas in yoghurt fed rats the intestinal transit time was remarkably less than that in milk fed rats. There were found to be significant correlationship between the haematological parameters intestinal Fe absorption and intestinal transit time. NGKR

129 Wilson (CR), Andrews (WH), Poelma (PL) and Bruce (VR). Recovery of Salmonella from fluid milk. **Journal of Food Protection** 51(5); 1988; 409-411

Methodology was developed for isolation of **Salmonella** from skim milk, 2% fat, milk, whole milk and buttermilk. Lactose broth, lactose broth plus brilliant green dye, buffered peptone water and each milk type plus brilliant green dye were evaluated as preenrichment broths. Incubation temp. of 35 and 43 C were compared for use at the preenrichment stage. The recovery of **Salmonella** was determined after selective enrichment in selenite cystine, tetrathionate and Rappaport-Vassiliadis broths. Results indicated that fluid milk should be examined for **Salmonella** by being preenriched in lactose broth, subcultured to selenite cystine and tetrathionate broths and streaked to selective agars, with 35 C as the incubation temp. throughout the analysis. AS

Goat's milk

130 De Buyser (ML), Dilasser (F), Hummel (R) and Bergdoll (MS). **Enterotoxin and toxic shock syndrome toxin-1 production by staphylococci isolated from goat's milk. International Journal of Food Microbiology** 5(4); 1987; 301-309

Staphylococci were isolated from 81 of 238 milk samples from 120 goats from 6 different French herds that presented no evidence of clinical mastitis. **Staphylococcus aureus** strains were isolated from five milk samples with **S. caprae** and **S. epidermidis** being the most prevalent of the 76 coagulase-negative staphylococcal sp. isolated. An additional 92 staphylococcal strains, including, 48 **S. aureus** strains, that were isolated by several lab. from goats milk, were also analyzed. 52 **S. aureus** strains were characterized; 48 (92.3%) were classified in the host-specific var. **ovis**. 1 (1.9%) was classified in the host-specific var. **bovis** and 3(5.7%) were non-host-specific. All 48 strains classified as **ovis**, were crystal-violet type C; 37 (77.1%) reacted to phage 78, 43 (89.6%) reacted to phage 740, and 39 (81.2%) produced enterotoxin C but no other enterotoxins. Toxic shock syndrome toxin-1 (TSST-1) production was always associated with enterotoxin C production except for one strain that produced only TSST-1. One non-host-specific strain produced enterotoxin D. None of the 85 coagulase-negative strains tested produced enterotoxins or TSST-1. AS

Sheep milk

131 Bautista (L), Gaya (P), Medina (M) and Nunez (M). A quantitative study of enterotoxin production by sheep milk staphylococci. **Applied and Environmental Microbiology** 54(2); 1988; 566-569

Of 124 staphylococcal strains isolated from sheep milk, 78 produced enterotoxin A, B, C, or D when evaluated by an enzyme-linked immunosorbent assay. RJ

Milk products

Cheese

132 Laleye (LC), Simard (RE), Lee (B-H), Holley (RA) and Giroux (RN). Involvement of heterofermentative **Lactobacilli** in development of open texture in cheeses. **Journal of Food Protection** 50(12); 1987; 1009-1012

Microbiological examination was carried out on Canadian Cheddar and Oka cheeses which exhibited gas formation and tissue defects. Results showed that lactobacilli, especially heterofermentative types, as well as organisms capable of using citrate were more numerous in defective cheese than in high quality products. In assays where APT or MRS media were used, higher number of viable lactobacilli were obtained than with MRS adjusted to pH 5.5 or Rogosa agar were used, especialy when younger cheese were sampled. The number of lactic streptococci did not differ between good quality Cheddar or rejected aged cheese. Coliforms, staphylococci, yeast, molds and clostridia appeared to have no relationship with the formation of gas in cheese late in the maturation process. MVG

133 Lelievre (J) and Lawrence (RC). Manufacture of cheese from milk concentrated by ultrafiltration. **Journal of Dairy Research** 55(3); 1988; 465-478

A review article describing aspects of cheese manufacture from milk concentrated by ultrafiltration (UF). A few of the aspects presented in this article are, effect of UF on milk components and technological problems arising during the conversion of concentrated milk into cheese, starter activity, differences between the composition of UF and conventional cheeses, UF cheese yields. MCV

134 Murthy (GK) and Cox (S). Evaluation of APHA and AOAC method for phosphatase in cheese. **Journal of the Association of Official Analytical Chemists** 71(6); 1988; 1195-1199

The evaluation of the two methods indicate that the APHA rapid colorimetric method and the official AOAC method cannot differentiate milk and microbial phosphatases on the basis of repasteurisation and analysis of cheese. MNK

135 Northolt (MD), Beckers (HJ), Vecht (U), Toepoel (L), Soentora (PSS) and Wisselink (HJ). **Listeria monocytogenes**: heat resistance and behaviour during storage of milk and whey and making of Dutch types of cheese. **Netherlands Milk and Dairy Journal** 42(2); 1988; 207-219

The heat resistance of **Listeria monocytogenes** suspended in milk was determined with a plate pasteurizer and glass capillary tubes. The reduction of the number of **Listeria** obtained by the plate pasteurizer was less than or equal to 5 log 10 units at 64.0 C for 10 s and 6-7 log 10 units at 67.0 C for 10 S. The heat resistance of freely suspended and phagocyted **Listeria** was investigated with glass capillary tubes. The surviving **Listeria** were determined with and without resuscitation at 4 C. Using the resuscitation method it appeared that phagocytosis did increase the heat resistance of one of the two tested during the first 1-2 days. Thereafter growth commenced. In intensively pasteurized milk (30 min 98 C) **Listeria** was not injured. Gouda and Maasdam types of cheese were made from **Listeria**-contaminated milk. During the manufacture **Listeria** was concentrated in the curd by factor 10, and a limited growth occurred. During 6 wks of ripening at 13 C the number of **Listeria** was almost constant. AS

136 Nussinovitch (A), Rosen (B) and Firstenberg-Eden (R). Effects of yeasts on survival of **Staphylococcus aureus** in pickled cheese brine. **Journal of Food Protection** 50(12); 1987; 1023-1024, 1043

The interactions between staphylococci and yeasts in pickled cheese brine were investigated. Above pH 5, **Staphylococcus aureus** grew in pickled cheese brine. Acid-consuming yeasts increased the pH of the brine to a level which enabled development of staphylococci. This indicates the need to monitor yeast contamination in cheeses preserved by the combination of acid and high salt. AS

Cheddar cheese

137 Kindstedt (PS) and Kosikowski (FV). Calcium, phosphorus, and sodium concentrations in Cheddar cheese. **Journal of Dairy Science** 71(2); 1988; 285-289

Growing concern over excess Na and Ca deficiency in the American diet and renewed interest in the role of calcium phosphate in cheese quality and identity underscore the need for up-to-date data on cheese mineral content. In view of this, commercial Cheddar cheese from 26 cheese plats in 7 acid Western states were analysed for their Ca, P and Na levels. Thirty-five cheese gave mean values for Ca of .715% with a range of .606 to .830%, for P.501% and a range of .442 to .556 and for Na .65% (NaCl 1.64%) with a range of .48 to .85% (NaCl 1.22 to 2.16%). The correlation coeff. for Ca and P was r = .90, but as Ca concn decreased from the norm by 3m mol/kg, P concn decreased only 2 m mol/kg. Sodium variation among cheeses indicated a lack of uniformity in industrial salting practices. The US FDA compliance policy stipulates that product Na content must not exceed the Na value on the label by more than 20%. The sodium ion electrode method used in the present study provides an accurate alternative for direct Na measurement in cheese as results agree with atomic absorption. MCV

Cottage cheese

138 Sheth (H), Jelen (P) and Shah (N). Lactose hydrolysis in ultrafiltration-treated cottage cheese whey with various whey protein concentrations. **Journal of Food Science** 53(3); 1988; 746-748

Lactose hydrolysis by soluble **Aspergillus oryzae** beta-galactosidase was studied in (a) ultrafiltration (UF) permeate containing varying concn of isolated beta-lactoglobulin or serum albumin; (b) UF retentate at four protein levels; and (c) cottage cheese whey during the UF treatment in an Amicon stirred cell unit. The rate and extent of lactose hydrolysis achieved in all the conditions studied was independent of protein concn in the whey preparations used. After 6 h of the simultaneous UF-lactose hydrolysis process at room temp. similar hydrolysis level was achieved in the retentate as in the batch hydrolysis process. The average degree of hydrolysis in the permeate was 52.6%. The retentate added to milk at room temp. hydrolysed 93% of the lactose in 15 h. AS

Whey

139 de Wit (JN), Hontelez-Backx (E) and Adamse (M). Evaluation of functional properties of whey protein concentrates and whey protein isolates. 3. Functional properties in aqueous solution. **Netherlands Milk and Dairy Journal** 42(2); 1988; 155-172

In this paper the methods used for assessment of functional properties in aqueous systems are described. The results obtained, using both whey protein isolates and industrially-prepared whey protein conc. have been reported in a comparative way. It has been shown that some typical characteristics of the single whey proteins are reflected in their functional properties (e.g. solubility, foaming and emulsifying properties). Moreover it appeared that 10% solutions of both Alpha-lactalbumin and of thoroughly desalted Beta-lactoglobulin do not show any thermally-induced gelation properties up to 100 C. The functional properties of the industrially-prepared whey protein products appear to be primarily related to the effects of processing history and composition of the protein products involved. A comparison of the functional properties of single whey proteins with those of the industrially-prepared whey protein products revealed that too high temp. during processing are most harmful, in particular in acid media (4.0 < pH < 6.0) or in the presence of Ca salts at 6.0 < pH < 7.0. Reference whey proteins are introduced in order to provide the possibilities for comparing the results obtained using these (arbitrarily selected) characterization techniques with results of other research workers. AS

140 Griethuysen-Dilber (EV), Flaschel (E) and Renken (A). Process development for the hydrolysis of lactose in whey by immobilized lactose of **Aspergillus oryzae. Process Biochemistry** 23(2); 1988; 55-59

In this investigation the process development for the hydrolysis of lactose in whey by Immobilised lactose of **Aspergillus oryzae** has been presented. The immobilised lactose of **Aspergillus oryzae** was used for the hydrolysis of lactose in partially deprotenised whey in a fluidised bed reactor packed with motionless mixers. The lactose was immobilised on chitosan-coated silica gel particles by means of glutanaldehyde. It was seen that the kinetics of both soluble and immobilised lactose followed Michaelis-Menten kinetics with product inhibition by galactose. NGKR

141 Mailliart (P) and Ribadeau-Dumas (B). Preparation of beta-lactoglobulin and beta-lactoglobulin-free proteins from whey retentate by NaCl salting out at low pH. Journal of Food Science 53(3); 1988; 743-745, 752

Solubility of the main proteins in 10 x acid and rennet whey retentates was studied in the pH range 2.0, to 4.0 in the presence of NaCl from 2 to 15% (w/v) final concn at 20 C to find fractionation conditions suitable for preparing pure beta-lactoglobulin and beta-lactoglobulin-free whey proteins and scaling up. At pH 2.0, 7% NaCl, 20 min holding time, nearly all beta-lactoglobulin remained soluble while a precipitate (P1) containing all other proteins was formed. Pure beta-lactoglobulin was quantitatively recovered by salting-out the centrifugation supernatant at 30% NaCl (w/v) final concn P1, insoluble at pHs lower than 4.0, was made soluble at any pH by dissolving at pH 9.0, dialyzing against 50mM formic acid (pH 3.0) and freeze-drying. AS

142 Whalen (CA), Gilmore (TM), Spurgeon (KR) and Parsons (JG). Yoghurt manufactured from whey-caseinate blends and hydrolyzed lactose. Journal of Dairy Science 71(2); 1988; 299-305

The replacement of NDM by economical whey-caseinate blends at 50 and 100% in the manufacture of yoghurt was studied. Lactose in the yoghurt mixes was hydrolyzed to 50% and 75% before fermentation to increase sweetness, which reduced added sucrose and simultaneously reduced lactose. Two taste panels detected flavour differences between yoghurts from the 100% replacement formula and the control yoghurts containing the full amount of NDM but could not detect flavour differences between the control yoghurts and the 50% replacement formula. Although the experienced panelists preferred the unhydrolyzed yoghurts over the lactose-hydrolyzed yoghurts, the consumer taste panelists could not detect any flavour differences and preferred the unhydrolyzed yoghurts equally. All yoghurts had excellent body and texture. Yoghurts made with whey-caseinate blends and less sucrose had lower calorie contents than the control yoghurts. Whey-caseinate blends lowered the cost of manufacture, but the enzyme preparation used for lactose hydrolysis raised the cost of manufacture slightly. AS

Whey proteins

143 Vaitheeswaran (NI) and Bhat (GS). Influence of lactic cultures in denaturation of whey proteins during fermentation of milk. **Journal of Dairy Research** 55(3); 1988; 443-448

Undenatured whey protein (UWP) content of skim milk acidified with lactic acid or cultured with lactic cultures was estimated by a dye-binding method. The UWP content decreased with increase in acidity and the denaturation was only partly reversible on neutralization to the original acidity. The decrease in UWP was higher in cultured milk than in the milk acidified to the same extent with lactic acid, indicating the effect of lactic cultures in denaturation of whey proteins during fermentation of milk. Among the lactic cultures the denaturation effect of **Lactobacillus delbrueckii** subsp. **bulgaricus** was highest, followed by **Streptococcus salivarius** subsp. **thermophilus**, **Lactococcus lactis** subsp. **lactis** and **Lact. lactis** biovar **diacetylactis**. Denaturation of whey proteins by lactic cultures was found to be partly irreversible. AS

Yoghurts

144 Schaafsma (G), Dekker (PR) and de Waard (H). Nutritional aspects of yoghurt. 2. Bioavailability of essential minerals and trace elements. **Netherlands Milk and Dairy Journal** 42(2); 1988; 135-146

The bioavailability of Ca, P, Mg, Zn and Fe from diets based on milk (M), lactase-treated milk (L), yoghurt (Y) or pasteurized yoghurt (P) was studied in four groups of rats. A fifth group, fed a commercial rat diet served as a reference. Reduction of dietary lactose, either by fermentation in Y or P or lactase treatment in (L) decreased the bioavailability of Ca, Zn and particularly Mg, as measured by intestinal absorption, urinary excretion and bone content of these elements. However, the decrease caused by fermentation was relatively small and not very important from a nutritional point of view. Fermentation enhanced the intestinal absorption of P. The intestinal absorption of Fe in rats fed M, Y or P predominantly occurred in the large intestine. The bioavailability of Ca, Mg, P and particularly Zn from the dairy diets (M, L, Y and P) was superior as compared to that from the commercial diet. AS

145 Schaafsma (G), Derikx (P), Dekker (PR) and de Waard (H). Nutritional aspects of yoghurt. 1. Microbial lactase activity and digestion of lactose. **Netherlands Milk and Dairy Journal** 42(2); 1988; 121-134

Milk fermented by a culture of **L. bulgaricus** and **S. thermophilus** (yoghurt) shows microbial lactase activity which survives gastric digestion and might contribute to intestinal digestion of lactose. Therefore, and because of its lower lactose content, yoghurt might be better tolerated by lactase-deficient subjects than milk. The significance of lactase in yoghurt was investigated in rats which are known to be lactase-deficient. Five groups of rats were fed for six wk diets based on milk (M, n = 12), lactase-treated milk (L, n = 12), yoghurt (Y, n = 12), pasteurized yoghurt (P, n = 12) or a commercial rat diet (C, n = 6). Rats fed Y or P did not show significant difference in feed efficiency, blood galactose response and relative caecum wt. indicating that microbial lactase in Y did not contribute significantly to the digestion of lactose in vivo. Rats fed milk showed a weak blood galactose response, a reduced food consumption and wt. gain and an increased relative caecum wt. as compared to the other groups. These results are in agreement with the experience in lactase-deficient subjects that yoghurt and lactase-treated milk are better tolerated than milk. AS

Milk proteins

146 Clarke (T). A reference milk system for instrumental measurement of milk fat and protein. **Journal of Dairy Research** 55(3); 1988; 355-360

A reference milk system (Clarke system) using primary reference milks made from preserved natural bovine milks (PNM) and standard reconstituted milk (SRM) has been developed to enable accurate calibration of milk analysing instruments. The PNM have values of 2, 3, 4, 5 and 6% fat and 3.5, 2.7, 3.4, 4.2 and 3.3% protein resp. and can be stored for 4 months without detectable change in fat or protein content. The above reference milk system utilizes SRM as a secondary reference milk to enable regular checking of the stability of the instrument calibration during routine testing (e.g. after every 100 samples). Over several months seven lab. using 13 fat-testing instruments and seven protein-testing instruments achieved high levels of accuracy in weekly calibrations (coeff. of variation 1.1%) when they used the reference milk system and adhered to the prescribed calibration criteria. AS

147 Hajos (GY), Elias (I) and Halasz (A). Methionine enrichment of milk protein by enzymatic peptide modification. **Journal of Food Science** 53(3); 1988; 739-742

Methionine-enriched protein was produced from an enzymatically prehydrolyzed milk protein using an enzymatic peptide modification

(EPM) method with Alpha-chymotrypsin as catalyst. Methionine of the product was twice as high as that of the substrate protein. The incorporated methionine formed a covalent bond with the peptide chain in the product protein. The change in the number of peptide bonds was monitored by the degree of hydrolysis (DH). The slight change of the DH values revealed that a portion of the free amino acids was bound to the peptide chains during the reaction and that transpeptidation was the main process during the EPM treatment. The location of the newly incorporated amino acids was determined by identification of the terminal amino acids. The covalently bound methionine was located in C- and N-terminal positions in a ratio of 3:1. AS

Casein

148 Hosono (A), Shashikanth (KN) and Otani (H). Antimutagenic activity of whole casein on the pepper-induced mutagenicity to streptomycin-dependent strain SD 510 of **Salmonella typhimurium TA 98. Journal of Dairy Research** 55(3); 1988; 435-442

When the antimutagenic activity of milk (skim) or cultured milk (with **Streptococcus salivarius** subsp. thermophilus and Lactobacillus **delbrueckii subsp. bulgaricus**) components on the pepper-induced mutagenicity to streptomycin-dependent strain SD 510 of **Salmonella typhimurium TA** 98 was investigated, whole casein showed a significant antimutagenic activity. Casein fraction from skim milk showed well over 60% antimutagenic activity. **S. salivarius** subsp. **thermophilus** casein showed a similar activity to that of whole casein at 24 h and subsequently lost the activity, while **L. delbrueckii** subsp. **bulgaricus** milk casein showed the least activity. Heating at 121 C for 15 min completely destroyed the antimutagenic activity of casein. While acid or papain digestion resulted in the loss of antimutagenic activity of casein, trypsin digestion had little effect although the digestion of casein by each proteinase was over 75%. Beta-casein, egg albumin and bovine serum albumin also had a similar antimutagenic activity to that of whole casein. It is possible that the antimutagenic activity of these proteins could be due to their hydrophobic nature. MCV

149 Rolllema (HS), Brinkhuis (JA) and Vreeman (HJ). H-NMR studies of bovine K-casein and casein micelles. **Netherlands Milk and Dairy Journal** 42(2); 1988; 233-248

H-NMR spectra of bovine k-casein B(carbohydrate-free and carbohydrate-containing fractions) and of bovine casein micelles were recorded. The K-casein micelles were studied in phosphate buffer and an simulated milk ultrafiltrate containing D_2 O (SMUF/D_2O). Native and size fractionated bovine casein micelles were studied in SMUF/D_2 00 (i.e. in the absence of whey-proteins and lactose). Protein NMR spectra were observed, consisting of a superposition of a spectrum with a relatively small line width and strongly broadened spectrum. The former spectrum indicates the existence of protein regions with substanital conformational mobility. In the case of k-casein micelles the flexible region can unequivocally be identified as the C-terminal part of the polypeptide chain. The hinge position is located between residues 86 and 96. For bovine casein micelles the results indicate that the same K-casein segment constitutes the major part of the flexible regions, in addition indications were found for a contribution from parts of other casein components. In the case of casein micelles it was found that only approx. 50% of the K-casein molecules contribute to the flexible regions. Results of experiments with size-fractionated casein micelles were found to be in accordance with the hypothesis that K-casein is located at the surface of the casein micelles. AS

Lactoglobulins

150 O'Neill (T) and Kinsella (JE). Effect of heat treatment and modification on conformation and flavour binding by Beta-lactoglobulin. **Journal of Food Science** 53(3); 1988; 906-909.

The flavour binding behaviour of native Beta-lactoglobulin(Beta-Lg) was significantly altered by thermal or chem. modification. Upon heat-treatment at 75 for 10 and 20 min. the binding affinity for 2 nonanone was reduced and the number of sites for binding was increased. This was related to conformational changes and aggregation of Beta-Lg. Reduction of the disulphide bonds and ethylation of carboxylic acid groups also induced conformational changes which reduced the binding affinity of Beta-Lg for 2-nonanone. AS

MEAT AND POULTRY

Meat

151 Johnson (SK). The determination of hydroxyproline in meat using gas chromatography-Mass spectrometry. **Meat Science** 22(3); 1988; 221-227

A method is described for the detn. of 4-hydroxyproline in meat using gas chromatography-mass spectrometry. The amino acid is converted into its N(O)-trifluoroacetyl n-propyl ester, gas chromatography being carried out with the mass spectrometer in the selected ion monitoring (SIM) mode giving high sensitivity and selectivity for the hydroxyproline derivative. AS

152 Montel (M-C) and Champomier (M-C). Arginine catabolism in **Lactobacillus sake** isolated form meat. **Applied and Environmental Microbiology** 53(11); 1988; 2683-2685

Lactobacillus sake isolated from meat can hydrolyze arginine via the arginine deiminase pathway. Two enzymes, arginine deiminase and ornithine transcarbamylase, have been revealed by detection of their reaction products, citrulline and ornithine, resp. The production of citrulline depends on the concn of glucose in a synthetic medium; it does not occur when the concn of glucose is 27.5 mM or higher. AS

153 Oellingrath (IM) and Slinde (E). Sensory evaluation of rancidity and off-flavour in frozen stored meat loaves fortified with blood. **Journal of Food Science** 53(3); 1988; 967-968

Meat loaves with 0-5% blood added were stored at -20 C for 1 yr and evaluated for rancidity and off-flavour by a descriptive sensory panel. Significantly higher rancidity and off-flavour values were observed in meat loaves with 1% and 2% blood than in products with no blood added. When 3 to 5% blood was added, the calculated molar ratio of polyunsaturated fatty acids (PUFA) to heme was in the region where heme compounds have been observed to act as antioxidant, and no further increase in rancidity or off-flavour was observed. AS

154 Sano (T), Noguchi (SF), Tsuchiya (T) and Matsumoto (J). Dynamic viscoelastic behaviour of natural actomyosin and myosin during thermal gelation. **Journal of Food Science** 53(3); 1988; 924-928

The changes in viscoelasticity of natural actomyosin and myosin during thermal gelation were investigated by dynamic viscoelasticity measurments. Thermal gelation of natural actomyosin could be divided into four characteristic temp. ranges. The storage modulus increased considerably in the 32-43 C range, decreased sharply in the 43-52 C range, and then increased again in the 52-80 C range. For the thermal gelation of myosin, the storage modulus increased in two steps at two temp. ranges i.e., 30-41 C and 51-80 C. An increase in the loss modulus was observed at an early stage of each of the two ranges. AS

155 Seideman (SC), Koohmaraie (M) and Crouse (JD). The influence of muscle fiber size on tenderness in a maturity heifers. **Journal of Food Quality** 11(1); 1988; 27-34

156 Solomon (MB) and Montgomery (AR). Comparison of methods for quantifying fiber types in skeletal muscle tissue. **Journal of Food Science** 53(3); 1988; 973-974

Measurements obtained using three bundle fiber sizes were compared with the template (4.7 cm^2 in area) method and the actual fiber population present in the entire photomicrograph. Longissimus muscles from lamb, beef, and pork were evaluated. Muscle fiber populations measured by the template or by selecting a min number of fibers to be counted (e.g., based on bundle size) were statistically equivalent (P > 0.01) to those measured using the entire micrograph and counting all the fibers present. Small bundles or a template designed to quantitate approx. 20% of the photomicrograph are recommended as the methods of choice for quantifying fiber populations because they would be less labour intense and would, therefore, result in a savings in time. AS

157 Stolle (FA). Establishing microbiological surveillence programmes at slaughterlines. A new concept of meat hygiene. **Meat Science** 22(3); 1988; 203-211

158 Weber (A), Wassilev (K), Moller (AJ), Schmidt-Nielson (B) and Glad (F). Computerized laser diffractometer for routine measurements of sarcomere lengths in meat. **Journal of Food Science** 53(3); 1988; 691-695

159 Young (LL), Reviere (RD) and Cole (AB). Fresh red meats. A place to apply modified atmospheres. **Food Technology** 42(9); 1988; 65-69

Modified atmosphere packaging for fresh red meats by vacuum packaging and gas flushed packaging has been described. This has been shown to prevent the meat from spoilage by microbes or by enzymatic degradation thus extending shelf life. Concn. of gas such as O, N, carbon dioxide needed for flushing has been given with their role in preservation. Different packaging materials have been suggested. GAR

Beef

160 Berry (BW), Smith (JJ), Secrist (JL) and Douglass (LA). Consumer response to restructured beef steaks processed to have varying levels of connective tissue. **Journal of Food Quality** 11(1); 1988; 15-25

161 Clarke (AD), Sofos (JN) and Schmidt (GR). Effect of algin/calcium binder levels on various characteristics of structured beef. **Journal of Food Science** 53(3); 1988; 711-713, 726

162 Konstance (RP), Heiland (WK) and Craig (JCJr). Component recognition of beef chuck using colorimetric determination. **Journal of Food Science** 53(3); 1988; 971-972

163 Marriott (NG), Phelps (SK), Costello (CA) and Graham (PP). Restructured beef with fat variations. **Journal of Food Quality** 11(1); 1988; 53-61

164 Miller (MF), Keeton (JT), Cross (HR), Leu (R), Gomez (F) and Wilson (JJ). Evaluation of the physical and sensory properties of jerky processed from beef heart and tongue. **Journal of Food Quality** 11(1); 1988; 63-70

165 Paterson (BC), Jones (KW), Gee (DH), Costello (WJ) and Romans (JR). Effects of carcass chilling temperature on loin steaks from bulls and steers. **Journal of Food Quality** 11(1); 1988; 43-52

166 Restaino (L) and Lyon (RH). Efficacy of petrifilm TM VRB for enumerating coliforms and Escherichia coli from frozen raw beef. **Journal of Food Protection** 50(12); 1987; 1017-1022

167 Rhee (KS), Smith (GC) and Dutson (TR). Relationships of ether-extractable fat vs folch fat and fat content vs cholesterol content for beef longissimus muscles. **Journal of Food Science** 53(3); 1988; 969-970

168 Smith (GC), Berry (BW), Savell (JW) and Cross (HR). USDA maturity indices and palatability of beef rib steaks. **Journal of Food Quality** 11(1); 1988; 1-13

Beef patties

169 Bhattacharya (M), Hanna (MA Mandigo (RW). Lipid oxidation in ground beef patties as affected by time-temperature and product packaging

parameters. Journal of Food Science 53(3); 1988; 714-717

170 Bhattacharya (M), Hanna (MA) and Mandigo (RW). Effect of frozen storage conditions on yields, shear strength and colour of ground beef patties. Journal of Food Science 53(3); 1988; 696-700

Beef steaks

171 Chu (YH), Huffman (DL), Egbert (WR) and Trout (GR). Colour and colour stability of frozen restructured beef steaks. Effect of processing under gas atmospheres with differing oxygen concentration. Journal of Food Science 53(3); 1988; 703-710

172 Hoelscher (LM), Savell (JW), Smith (SB) and Cross (HR). Subcellular distribution of cholesterol within muscle and adipose tissues of beef loin steaks. Journal of Food Science 53(3); 1988; 718-722

173 Keeton (JT), Leu (R), Vanderzant (C), Bohc (JJ), Griffin (DB), Savell (JW) and Cross (HR). Evaluation of fresh vacuum-packaged beef steaks coated with an acetylated monoglyceride. Journal of Food Science 53(3); 1988; 701-704

Bovines

174 Villarreal (R) and Will (PA). Effect of electrical stimulation on the bovine carcass. Journal of Food Quality 11(1); 1988; 35-42

Mutton

Sheep

Lamb

175 Shahat (AAEL), Ashry (MA) and Afify (WM). Effect of slaughter weight on lamb carcass lipid. Indian Journal of Animal Sciences 58(7); 1988; 848-850

The effects of slaughter wt. on the composition of fatty acids of adipose tissues taken from intramuscular and subcutaneous fatty tissues were studied in 24 slaughtered lambs. The percentages of palmitic acid (16:0) and stearic acid (18:0) increased, and of oleic acid (18:1) decreased. There were significant differences in fatty acid compositions of lipids extracted from both types of adipose tissues. The subcutaneous fat had significantly more oleic acid (18:1) with less stearic acid (18:0) and linoleic acid (18:2) than intramuscular fat. The saturates (16:0 and 18:0) increased at the expense of oleic acid (18:1) during growth phase. AS

Pork

176 Brown (T), Gigiel (AJ), Veronica (M) and Swain (MV). Immersion chilling of hot cut, vacuum packed pork primals. **Meat Science** 22(3); 1988; 173-188

177 Choi (YI), Kastner (CL) and Kropf (DH). Effects of hot boning and various levels of salt and phosphate on protein solubility, functionality, and storage characteristics of preblended pork used in frankfurters. **Journal of Food Protection** 50(12); 1987; 1025-1036

178 Choi (YI), Kastner (CL) and Kropf (DH). Effects of hot boning and various levels of salt and phosphate on microbial, TBA, and pH values of preblended pork during cooler storage. **Journal of Food Protection** 50(12); 1987; 1037-1043

179 Engel (RE), Post (AR) and Post (RC). Implementation of irradiation of pork for Trichina control. **Food Technology** 42(7); 1988; 71-75

Covers briefly regulatory roles, Trichina control by irradiation, FSIS responsibilities, quality control, product packaging, labelling and cooperation. BV

180 Sen (NP), Seaman (SW), Baddoo (PA) and Weber (D). Further studies on the formation of nitrosamines in cured pork products packaged in elastic rubber nettings. **Journal of Food Science** 53(3); 1988; 731-734, 738

181 Thomsen (HH) and Zenthen (P). The influence of mechanically deboned meat and pH on the water holding capacity and texture of emulsion type meat products. **Meat Science** 22(3); 1988; 189-201

Meat products

Hamburgers

182 Tantillo (G) and Tiecco (G). Research of soy proteins in frozen hamburgers. **Industrie Alimentari** 27(256); 1988; 27-29

Sausages

183 Korkeala (H), Lindroth (S), Ahvenainen (R) and Alanko (T). Interrelationship between microbial numbers and other parameters in the spoilage of vacuum-packed cooked ring sausages. **International Journal of Food Microbiology** 5(4); 1987; 311-321

The spoilage process of 60 vacuum-packed cooked ring sausages stored at 8 C was studied by determining the number of bacteria, sensory properties, pH and the headspace gas composition. Lactobacilli (cfu determined on Rogosa Sl. agar incubated anaerobically) multiplied in samples during storage and became the main microbial population of the sausages being also responsible for the spoilage. All variables examined showed a change as a function of lactobacilli. The change in these variables can be used as indication of deterioration. The judges began considering the samples unfit for human consumption after the lactobacilli count had reached 10^8 cfu/g. The probability that a lactobacilli count of 10^7 cfu/g caused spoilage of vacuum-packed cooked ring sausage was approx. 10%. Above the level of 10^8 lactobacilli/g a sharp decrease in pH from 6.3 down to approx. 5.4 was observed. The carbon dioxide concn in the vacuum-packs was constant, being under 10% untill the lactobacilli count exceeded 6.4 x 10^6 cuf/g, after which the carbon dioxide concn increased sharply up to 40-60%. AS

184 Makela (P) and Korkeala (H). **Lactobacillus** contamination of cooked ring sausages at sausage processing plants. **International Journal of Food Microbiology** 5(4); 1987; 323-330

The contamination of finnish cooked ring sausages with lactobacilli determined as organisms growing on Rogosa SL agar after 5 days of anaerobic incubation was studied at two sausage processing plants. After cooking, the skin of the sausages was almost free of lactobacilli and the surface of the sausages became contaminated with lactobacilli during chilling after cooking and during packing. Lactobacilli were found in the air and on the structures and equipment in the chill rooms and the packing rooms, and these areas were assumed to be sources of contamination for the sausages. The amount of lactobacilli in these areas varied between the plants examined. The number of lactobacilli in the sausage processing area apparently affected the extent of the contamination of the sausages. The lactobacilli contamination varied also during the working days. It is suggested that the extent of contamination has an effect on the shelf-life of the sausages. AS

185 Sher Ali (M). Simultaneous determination of dextrose, sucrose, maltose, and lactose in sausage products by liquid chromatography. **Journal of the Association of Official Analytical Chemists** 71(6); 1988; 1097-1100

The sugars were extracted from comminuted meat products with 52% ethanol. After filtration, the extracts were purified and analysed by liquid chromatography using a normal phase amino column and a differential refractometer detector. MNK

Poultry

Chickens

186 Lillard (HS). Effect of surfactant or changes in ionic strength on the attachment of Salmonella typhimurium to poultry skin and muscle. **Journal of Food Science** 53(3); 1988; 727-730

By scanning electron microscopy (SEM) it was shown that fewer bacteria attached firmly to poultry muscle in the presence of NaCl. By conventional cultural techniques, it was also shown that **Salmonella typhimurium** attached in about the same numbers when chicken skin or muscle was immersed in cell suspensions prepared with 0.85% saline, 0.1% peptone, 0.5M or 0.05M KH_2PO_4 buffers at pH 5, 7, 8 or saline plus 1% Tween 80. Cells in deep crevices which formed in muscle during water immersion were not visible by SEM until the tissue was shredded, suggesting entrapment of bacteria. Such entrapped bacteria would be inaccessible to treatments that could prevent firm attachement of cells to poultry tissue. AS

187 McNeill (J), Kakuda (Y) and Findlay (C). Influence of carcass parts and food additives on the oxidative stability of frozen mechanically separated and hand-deboned chicken meat. **Poultry Science** 67(2); 1988; 270-274

Mechanically separated chicken meat (MSCM) from necks and backs was blended with sodium tripolyphosphate (.1, .3, or .5%), sodium caseinate (.5, 1, or 2%), a rosemary extract (.01, .02, or .03%) and a commercial antioxidant mixture Dadex 2 (Daminco Inc., Mississauga, ONT) (.02, .05, or .08%) to evaluate their ability to prolong the oxidative shelflife of this product during frozen storage. Dadex 2 and rosemary were found to effectively delay malonaldehyde formation over a 7-m period, whereas sodium caseinate and sodium tripolyphosphate were found ineffective in retarding oxidative rancidity. A second study showed that MSCM from necks and backs, fronts, and rears underwent oxidative deterioration at a faster rate than hand-deboned ground meat from thighs and breasts. Although compositional analyses indicated that MSCM samples contained greater amounts of total fat and heme pigments, the mechanical deboning process, which results in extensive cellular disruption and oxygen incorporation, appeared to be a major contributing factor in promoting lipid oxidation in MSCM. AS

Broilers

188 Papa (CM) and Fletcher (DL). Effect of using restraint on postmortem muscle shortening and the textural quality of broiler breast meat. **Poultry Science** 67(2); 1988; 275-279

Two exp. were conducted to evaluate the effects of wing restraint during rigor development on the physical properties of broiler breast meat. Four trials were conducted in the first exp., using a total of 150 birds. Restraining treatments were applied post-mortem and consisted of an elbow (wing) fixing behind the carcass, lateral extension of the wings and attachement to a bar, and secure binding of the wings together behind the carcass. Results for the first two post-mortem restraints did not indicate significantly different shear values of the meat in comparison with that of the control. However, binding the wings securely behind the carcass toughened ($P < .05$) cooked meat samples from both **Pectoralis major** and **Pectoralis minor** muscles. The second exp. was conducted to evaluate the effect of ante-mortem wing restraint using treatments of lateral extension of the wings and a modified wing tie that appeared to reduce the severity of treatment on the live bird. In 2 trials using 60 birds, the results indicated longer ($P < .05$) muscle sarcomere lengths for **Pectoralis major** when using the modified wing tie, although tenderness of the cooked meat was not improved. Lateral extension resulted in longer sarcomere lengths for **Pectoralis minor**, consistent with decreased ($P < .05$) shear values of the cooked meat. These exp. did not indicate that alternative wing position would improve the textural qualities of broiler breast meat. AS

Turkeys

189 King (AJ) and Earl (LA). Effect of selected sodium and potassium salts on TBA values of dark meat turkey patties. **Journal of Food Science** 53(3); 1988; 723-726

Thiobarbituric acid (TBA) values were determined on stored, uncooked and cooked patties containing dark ground turkey meat and selected sodium and potassium salts. No clear association between pH of slurries made from patties and TBA values was observed. Factor analysis showed significant ($P < 0.05$) main effects due to formulation, heating, storage and day of test and significant ($P < 0.05$) interactions for heating x storage, heating x day, heating x formulation, heating x storage x formulation, storage x day and storage x formulation. Results indicated that polyphosphates added alone were effective in retarding lipid oxidation in cooked products. There was no synergistic effect of polyphosphates combined with NaCl. AS

Poultry products

Eggs

190 Alaboud (AR), Hammed (DA) and Ali (DS). Microbial content of market eggs. **Indian Journal of Animal Sciences** 58(7); 1988; 768-770

Eleven different bacterial (**Enterobacter, Staphylococcus, Bacillus, Klebsiella, Proteus, Escherichia, Pseudomonas, Salmonella, Shigella, Alkaligenes,** and **Citrobacter**) and 3 fungal genera (**Aspergillus, Cladosporium** and **Candida**) were isolated from egg-shells of 300 eggs collected from the veterinary college farm and Badosh plant. Moreover, 6 genera of gram-negative rods (**Enterobacter, Proteus, Alkaligenes, Pseudomonas, Escherichia,** and **Klebsiella**) were recovered from 150 eggs. The significance of results has been discussed. Proposed hygienic measures for improving egg quality have been recommended. AS

Egg white

191 Kitabatake (N), Shimizu (A) and Doi (E). Preparation of transparent egg white gel with salt by two-step heating method. **Journal of Food Science** 53(3); 1988; 735-738

A heat-induced transparent gel from egg white was prepared at low pH and low ionic strength by a one-step heating method. The addition of NaCl to the egg white formed a turbid gel on heating. Egg white, first diluted with water, gave a transparent solution upon heating of this mixture. The solution formed a transparent gel when heated with NaCl up to a concn of 0.3M for a second time. The transparent gel obtained at 150 mM NaCl was more firm and less adhesive than the turbid gel prepared by the one-step heating method at the same pH, protein concn and NaCl concn. AS

Egg yolk

192 Warren (MW), Brown (HG) and Davis (DR). Solvent extraction of lipid components from egg yolk solids. Journal of the American Oil Chemists" Society 65(7); 1988; 1136-1139

The effects of solvent systems on extraction of lipid components from commercially spray-dried egg yolks were investigated. Hexane, hexane:isopropanol (2:1), and chloroform methanol (2:1) were studied, and the effects of temp. of extraction and ratio of solvent to egg were examined in a 3 x 2 x 2 factorial design. Hexane removed more fat and phospholipid and less cholesterol and pigment than the more polar solvents. Increased solvent ratio extracted more of the lipid components, although temp. of the extraction had little effect on removal of the lipid components. AS

SEAFOODS

Fish

193 Dawson (VK) and Allen (JL). Liquid chromatographic determination of rotenone in fish, crayfish, mussels, and sediments. Journal of the Association of Official Analytical Chemists 71(6); 1988; 1094-1096

An analytical procedure is described for determining residues of rotenone in fish muscle, fish offal, crayfish, fresh water mussels, and bottom sediments. Rotenone is the active constituent of derris root which has long been used as an insecticide and as an pesticide to remove unwanted fish population. MNK

194 Hatae (K), Yoshimatsu (F) and Matsumoto (JJ). An integrated quantitative correlation of textural profiles of fish. Journal of Food Science 53(3); 1988; 679-683

The textural properties of cooked muscle of five fish sp., shipjack, flying fish, common horse mackerel, plaice and channel rock fish, were evaluated by a consumer panel. The data thus obtained were analyzed by a Multivariate Analysis method, using quantitative categories, which normally would be considered qualitative. Although an analysis of the data of the five sp. as singular components of the total proved unsuccessful, satisfactory discrimination was attained by comparing correlation ratios of the data of each pairing of the fish sp., each sp. paired against the other. Based on these ratios, an integrated correlation indicating the textural profile differences between the totality of five fish sp. by means of multidimensional diagram was determined. AS

195 Hennigar (CJ), Buck (EM), Hultin (HO), Peleg (M) and Vareltzis (K). Effect of washing and sodium chloride on mechanical properties of fish muscle gels. Journal of Food Science 53(3); 1988; 963-964

Excellent gels, as measured by fold test, were prepared from three sp. of fish without washing if NaCl were added. Dependent on species, excellent to adequate gels could be prepared from fish muscle without NaCl, provided that the minced tissue was washed prior to gel formation. Red hake formed an excellent gel, cod formed a good gel, and flounder formed a fair gel in the absence of NaCl, as judged by fold scores of 5, 4 and 3 resp. AS

Cownose ray

196 Licciardello (JJ) and Ravesi (EM). Frozen storage characteristics of cownose ray (Rhinoptera bonasus). **Journal of Food Quality** 11(1); 1988; 71-76

In this investigation the vacuum packed portions of cownose ray (Rhinoptera bonasus) flesh frozen stored at -18 C were analysed for quality by testing for ammonia, N, pH, peroxide value, TBA content, extractable protein N and by sensory evaluation. The results showed that they were still acceptable after 60 wk storage. NGKR

Kelps

197 Kajiwara (T), Hatanaka (A), Kawai (T), Ishihara (M) and Tsuneya (T). Study of flavour compounds of essential oil extracts from edible Japanese kelps. **Journal of Food Science** 53(3); 1988; 960-962

Volatile oils isolated by steam distillation of fresh edible kelps (**Laminaria angustata, L. japonica, Kjellmaniella crassifolia, Costaria costata, Ecklonia cava, Alaria crassifolia, Undaria pinnatifida**) were analyzed by GC and GC-MS. The major components characterized in the volatile oils of the kelps was isolated and identified as a sesquiterpene alcohol known as cubenol. Flavour evaluation determined that this alcohol was an important contributor to the kelp flavour. Additional major components included (E,Z)-2,6-nonadienal, (E)-2-nonenal, (Z,Z)-3,6-nonadienal, (E,Z)-2,6-nonadienol, (E)-2-nonenol, myristic acid, and Omega-hexadecenoic acid. AS

Salmon

198 Craig (CL) and Powrie (WD). Rheological properties of fresh and frozen chum salmon eggs with and without treatment by cryoprotectants. Journal of Food Science 53(3); 1988; 684-687

Chum salmon eggs from six batches of ovaries were subjected to flat plate compression loading to determine the membrane strength. The intact eggs withstood compression forces of between 0.47 to 1.22 Newtons. The membrane rupture energy ranged from 2.36 to 7.99 (x 10^{4}) Joules. After freezing fresh eggs at -10 C for 7 days, the average membrane rupture energy upon thawing was 46% less than that for fresh eggs. The apparent viscosities of fresh and frozen-thawed yolk of chum eggs were similar, and it may be concluded that yolk proteins were not cryodamaged. Sodium chloride was found to be the most effective croprotective agent for the prevention of membrane cryodamage. AS

Sardines

199 Kanoh (S), Wakisaka (M), Nakayama (T) and Niwa (E). Guanidine hydrochloride induced gel formation from sardine whole body. **Bulletin of the Japanese Society of Scientific Fisheries ('Nihon Suisan Gakkaishi')** 54(4); 1988; 673-676 (Ja).

Gel forming ability of sardine (whole body) induced by protein denaturant was studied. The paste obtained by homogenising the whole body of sardine was treated with different denaturant, such as guanidine hydrochloride (GU-HCl) and its thiocyanate (GU-SCN) and then gelled by dialysis against different solution at 4 C for 96 h. The paste treated with GU-HCl for 24 h, at temp of 70 C and dialysed against distilled water, resulted in gel strengthened with the increasce in concn to 8 M (moles /kg sardine). The proximate composition of this gel was, moisture 87.5 %, crude protein 8.9%, crude fat 1.5 %, and crude ash 0.5 %. From the paste, 97.6-99.2% GU-HCl was removed by dialysis. SGB

200 Nonaka (M), Potey (LJL), Tsai (JS), Murakami (H) and Omura (H). Texture curves and characteristics values of emulsified product of sardine with chicken-egg. **Journal of Japanese Society of Food Science and Technology '(Nippon Shokuhin Kogyo Gakkaishi')** 35(7); 1988; 507-512 (Ja).

Emulsified product with high emulsion activity and stability was manufactured by stepwise mixing of frozen sardine fillet with chicken-egg and soybean oil. Texture curves were estimated at 3 steps of the emulsifying processing. As processing proceeds, some variation of the curves was observed, accompanying decrease of the forces. From the practical point of view in food manufacture, several textural characteristic values were estimated by a rheometer equipped with a personal computer, through which the values were calculated using an inherent program. They were hardness, cohesiveness, adhesiveness, gumminess and proposed S. brittleness. When sardine fillet alone was minced as 1st processing, all the values were higher than those of commercial mayonnaise. As processing proceeds, while cohesiveness was kept unchanged, other values decreased and were lower than those of mayonnaise. However, the rate of decrease was different according to the characteristics. Textural characteristic values were also determined by varying mixing ratio of chicken-egg or soybean oil in the emulsified products. In these cases too, quite similar variation of the values were induced, except cohesivenness. Rates of the variation were also different according to the characteristic values. AS

201 Won (MP), Shinohara (K), Sekimoto (K), Nanaka (M), Hayakawa (I) and Omura (H). Spinning of sardine meat protein. **Journal of Japanese Society of Food Science and Technology '(Nippon Shokuhin Kogyo Gakkaishi')**-35(7); 1988; 491-496 (Ja).

Spun protein fiber from sardine meat protein was prepared by extruding the alkaline dope into acidic coagulating solution. Relationship between the composition of the dope and its spinability was examined to establish the procedure. Protein content in the dope was limitted to 3.5% and ratio of protein to NaOH should be 10:1-20:1. In addition, Na-alginace was indispensable and protein. Na-alginate ratio was 3:1-5:1 for obtaining the fiber with good spinability, elasticity, tensile strength and protein recovery. While the coagulating solution was desired to be acidic, the spinability as well as several properties of the fiber such as diameter, strength, elasticity and protein content varied with pH. The fiber showed a pretty good amino acid composition with a little less in sulphur-containing amino acids. AS

Sea-bream

202 Tachibana (K), Doi (T), Tsuchimoto (M), Misima (T), Ogura (M), Matsukiyo (K) and Yasuda (M). The effect of swimming exercise on flesh texture of cultured red sea-bream. **Bulletin of the Japanese Society of Scientific Fisheries ('Nihon Suisan Gakkai-shi')** 54(4); 1988; 677-681 (Ja).

The effect of swimming exercise on retardation of softening of flesh was examined with cultured red sea-bream **Pagrus major** (2 yr old) exercised for 0 (control) or 12 h a day during 1, 2 or 4 wks in water flow of 2.5 BL (body length)/s. Fish were instantly killed by exsanguination and stored in ice for 12 days. Pieces of ordinary muscle of the dorsal part and caudal part were sampled from the iced fish every 2 days up to the 12th day, and myofibrils were prepared from the muscle. The number of sarcomeres composing the myofibrils was counted under a microscope. The frequency in percentage of F myofibrils composed of 1 to 4 sarcomeres, was used as an index of softness of the flesh. The frequency of F increased during storage faster in the cultured fish than in the wild ones, and slower in exercised fish than in nonexercised ones among cultured fish, especially at the caudal muscle. These results suggest that the flesh texture of cultured red sea-bream may be improved by swimming exercise. AS

Tunas

203 Chow (C-J), Ochiai (Y), Watabe (S) and Hashimoto (K). Effect of freezing and thawing on the discolouration of tuna meat. **Bulletin of the Japanese Society of Scientific Fisheries ('Nihon Suisan Gakkai-shi')** 54(4); 1988; 639-648

Discolouration profile of unfrozen and "frozen/thawed" meat of bluefin, yellowfin and bigeye tunas during iced storage were examined considering metmyoglobin (met Mb) to total Mb ratio (met Mb %), solubility (extractability) of Mb and tristimulus values of Hunter colour difference scale (`L', a' and `b' values) as parameters. During storage, met Mb% rapidly increased, while Mb solubility and `a' value decreased remarkably and, `L' and `b' values were tending to increase. Discolouration of frozen/thawed meat generally proceeded faster than that of unfrozen meat during ice storage in the bluefin and yellowfin tuna sp. No significant difference in discolouration profiles were observed among surface, middle and inner portions of dorsal and ventral meat. Bigeye tuna whether unfrozen or frozen/thawed, discoloured very slowly during iced storage. Studies on the effect of prestorage temp. on the discolouration of bluefin tuna meat showed that the rate was slower in meat stored at lower temp. SGB

204 Kanoh (S), Aleman Polo (JM), Kariya (Y), Kaneko (T), Watabe (S) and Hashimoto (K). Heat-induced textural and histological changes of ordinary and dark muscles of yellowfin tuna. Journal of Food Science 53(3); 1988; 673-678

When a fresh specimen of yellowfin tuna **Neothunnus albacore** was analyzed, the cross-sectional area of ordinary (white) muscle fiber was 3.5 times larger than that of dark muscle. As heating temp. was raised, the shear force of dark muscle became progressively larger than that of ordinary muscle. Simultaneously, the A band in the ultrastructure of both muscles was stained more densely. While the Z line in I band of dark muscle still remained, that of ordinary muscle disappeared completely by heat treatment at 60 C for 30 min. Therefore, the differences in toughness change during heat treatment correlated well with that fiber sizes and ultrastructures of the two types of muscle. AS

205 Ochiai (Y), Chow (C-J), Watabe (S) and Hashimoto (K). Evaluation of tuna meat discolouration by Hunter colour difference scale. **Bulletin of the Japanese Society of Scientific Fisheries ('Nihon Suisan Gakkaishi')** 54(4); 1988; 649-653

Attempts were made to evaluate the discolouration of unfrozen tuna meat, and frozen and thawed ("frozen/thawed") tuna meat by Hunter tristimulus values (L, a and b), as a substitute for the metmyoglobin (metMb) ratio (metMb%). Correlation coeff. between metMb% and a/b ratio was higher than that between metMb% and a value. The coeff. was around -0.7 for bluefin and -0.8 - -0.9 for yellowfin tuna meat, suggesting that a/b ratio can be used as a parameter to evaluate the discolouration of tuna meat. L and b values were judged not to be useful parameters, since the former was remotely correlated with metMb% and the latter showed only a small change. AS

Fish products

Surimi

206 Babbitt (JK) and Reppond (KD). Factors affecting the gel properties of surimi. Journal of Food Science 53(3); 1988; 965-966

Surimi batter was prepared by various mixing machines with or without vacuum. Rheological properties of the cooked gels were then tested by punch and torsion methods. If a vacuum were used during the evaluation of surimi, the cooked gels had similar properties regardless of what type of mixer was used. The diameter of the stuffing horn affected the punch and torsion tests. The density of the cooked gels was correlated with some test results. AS

Molluscs

Crab

207 Yoon (IH) and Matches (JR). Growth of pathogenic bacteria on imitation crab. Journal of Food Science 53(3); 1988; 688-690

Food poisoning bacteria, **Staphylococcus aureus**, **Salmonella**, **Yersinia** enterocolitica and **Aeromonas hydrophila**, were inoculated onto imitation crablegs and flaked crab. Inoculated samples were incubated at 0, 5, 10, 15 C. **Staphylococcus**, **Salmonella**, and **Aeromonas** increased at 15 and 10 C but not at the two lower temp. **Yersinia** grew at the four temp. tested. The rapid growth at these temp. clearly indicated that the pathogens could be potential hazards if the products were contaminated and subjected to temp. abuse after leaving the processing plants. AS

PROTEIN FOODS

Infant foods

208 Niola (I). Soya-based formulas in babies' feeding. **Industrie Alimentari** 27(256); 1988; 1-5 (It).

Reports nutritional values and clinical effects on babies fed soy-based infant formulas and its advantage in developing countries for exploiting local resources at generally reduced costs. BV

ALCOHOLIC AND NON-ALCOHOLIC BEVERAGES

Alcoholic beverages

209 Pierce (WM), Clark (AOJr) and Hurst (HE). Determination of ethyl carbamate in distilled alcoholic beverages by gas chromatography with flame ionization or mass spectrometric detection. Journal of the **Association of Official Analytical Chemists** 71(4); 1988; 781-784

Quantitative methods are detailed for detn. of ethyl carbamate in distilled alcoholic beverages by capillary gas chromatography with flame ionization detection (GC/FID) and by packed-column gas chromatography/mass spectrometry (GC/MS) using selected ion monitoring. Five g samples of distillate of known ethanol concn. are diluted with water to 25% ethanol(v/v), washed with petroleum ether, and extracted with dichloromethane prior to GC/FID or GC/MS analysis. As necessary, sample extracts that exhibit GC/FID interference are passed through alumina for additional cleanup. When internal standards (**tert**-butyl carbamate and n-butyl carbamate for GC/FID, or ethyl (^{13}C- 15/N carbamate for GC/MS) were used for quantitation, the limit of detection for ethyl carbamate was in the range of 5-25 p.p.b. Coeff. of variation ranged from 3.5 to 6.0% for GC/FID detn. and from 1.4 to 3.2% for GC/MS. Correlation between methods for 22 random distillate samples ranging in concn. from approx. 40 to 800 p.p.b. gave a correlation coeff. (r) of 0.996. AS

Beer

210 Kaneda (H), Kano (Y), Osawa (T), Ramarathnam (N), Kawakishi (S) and Kamada (K). Detection of free radicals in beer oxidation. **Journal of Food Science** 53(3); 1988; 885-888

Non-alcoholic beverages

Coffee

211 Apostolopoulos (D) and Gilbert (SG). Frontal inverse gas chromatography as used in studying water sorption of coffee solubles. **Journal of Food Science** 53(3); 1988; 852-854

Frontal Inverse Gas Chromatography (FIGC) was used to study the combined effects of moisture, temp. and particle size on the water sorption of freeze-dried coffee. A moisture increase from 0 to 95% RH resulted in typical anti Langmuirian sorption isotherms. Lower temp. favoured sorption at equivalent water vapour pressures. The mesh size of coffee had only a slight effect on the amount of sorbed water at higher relative humidities but did affect FIGC. A comparison of the FIGC and static methods that the former was much faster and the sorption isotherms of the two methods were statistically different. AS

212 Popplewell (LM), Campanella (OH) and Peleg (M). Quantitative characterization of the particle size distribution of instant coffee during mechanical attrition. **Journal of Food Science** 53(3); 1988; 877-881

The bimodal particle size distribution of agglomerated and freeze dried coffees during mechanical attrition by tapping is presented by a mathematical model based on a normalized size and a modified beta distribution function. Its five dimensionless parameters are the modes of the fine and coarse fractions, their two corresponding variances and fines wt. fraction. The magnitude of these parameters and their progressive change enabled quantitative assessment of the role of shattering and surface erosion in this size reduction process and comparison between the attrition patterns of different kinds of particulates. AS

Fruit juices

213 Wills (RBH), Ford (NJ) and Greenfield (H). Comparison of sugar levels in sweetened and unsweetened fruit juices and fruit drinks. **Food Technology in Australia** 40(1); 1988; 22-23

In this investigation the levels of individual sugars in 49 unsweetened and sweetened fruit juices and fruit juices drink products obtained from retail market outlets in Sydney were determined in order to examine their differences. The sugars were analyzed by HPLC and the sugar content of fruit juice drinks was found to be about 10 g/100 ml in all types of drink which is similar to the average sugar content of sweetened fruit juices and the proportion of sucrose in fruit juice drinks is higher than in fruit juices since food regulations require a small quantity of fruit juice in drink products and permit addition of sugar to raise sweetness in the finished products to a perceptible desirable level. NGKR

Apple juices

214 Crapiste (GH) and Lozano (JE). Effect of concentration and pressure on the boiling point rise of apple juice and related sugar solutions. **Journal of Food Science** 53(3); 1988; 865-868, 895

An experimental procedure is proposed for the measurement of the boiling point of clarified fruit juices, minimizing hydrolysis of sucrose. Boiling point rises of glucose, fructose, and sucrose solutions and clarified apple juice were determined at different pressures and concn. ranging from 72 to 700 mbar and 17 to 72 Brix, resp. Experimental results indicated that both concn and pressure significantly affect boiling point elevation. Applicability of theoretical and empirical expressions to represent the experimental behaviour was analyzed. Sugar solutions behaved ideally up to approx. 35%. A method was proposed to predict boiling point rise of apple juice from experimental data for the basic sugar components. AS

215 Lee (H.S) and Wrolstad (RE). Apple juice composition. Sugar, nonvolatile acid, and phenolic profiles. **Journal of the Association of Official Analytical Chemists** 71(4); 1988; 789-794

Orange juices

216 Chen (CS). Bound water and freezing point depression of concentrated orange juices. **Journal of Food Science** 53(3); 1988; 983-984

Freezing points of orange juices (OJ) in the range 0 C to 65 C. Brix were measured using the Beckman differential thermometers. Equilibrium freezing curves of OJ were characterized by the approx. freezing point depression equation of bound water theory. The average effective mol. wt. was 235.6 plus or minus 3.3 for Valencia, Corriente and blended frozen conc. orange juice. The amounts of bound water were in the range 0.15 to 0.40 kg/kg solids. AS

Strawberry juices

217 Rwabahizi (S) and Wrolstad (RE). Effects of mold contamination and ultrafiltration on the colour stability of strawberry juice and concentrate. **Journal of Food Science** 53(3); 1988; 857-861, 872

Juices made from both good quality and mold-contaminated strawberries (cv Benton) were clarified by conventional filtration and ultrafiltration and processed into conc. Compositional and colour analyses were done on the single-strength juices, the juice conc. immediately after processing, and the same conc. after 6 wk storage at 20 C. Colour and appearance were also evaluated by sensory procedures after storage. Mold contamination induced significant increases in polymeric colour, browning and haze, the changes being more pronounced in the stored conc. Ultrafiltration resulted in an accelerated loss of monomeric anthocyanins during juice concn. Stored conc. from juices prepared by conventional filtration had more acceptable colour and appearance than those processed by ultrafiltration. AS

FATS AND OILS

Fats

218 Lee (T), Hastilow (C) and Smith (K). Simple method for derivatization of monoglycerides and diglycerides. Journal of the **Association of Official Analytical Chemists** 71(4); 1988; 785-788

A method has been developed for derivatization of monoglycerides and diglycerides to their propylesters by using propionic anhydride in the presence of pyridine. The derivatives are volatile and thus can be separated and identified by gas chromatography (GC). Completion of the reaction is monitored by thin-layer chromatography. Monoglyceride propyl esters were positively identified by gas chromatography and by gas chromatography/mass spectrometry. No side products were observed in the derivation reaction which requires 35 min at 75 C. GC analysis of the mono- and diglyceride propyl esters can be completed in approx. 30 min. AS

Fatty acids

219 Long (AR), Massie (SJ) and Tyznik (WJ). Rapid direct extraction derivatization method for the determination of acylglycerol lipids in selected sample matrices. **Journal of Food Science** 53(3); 1988; 940-942, 959

Acylglycerol lipids as total fatty acid methylesters (FAME) were rapidly determined by direct extraction derivatization from sample matrices utilizing 0.4N methanolic sodium methoxide in hexane solution and quantitated using gas chromatography. FAME values determined by the direct extraction derivatization (DED) method, and standard AOAC ether extraction saponification method were similar for all samples. The DED method was reproducible and required less than 35 min total sample preparation and analysis time compared to a minimum of 6 h needed for the standard AOAC method. The DED method yielded FAME derivatives of acylglycerol lipids which were free from interfering compounds when analyzed by gas chromatography. Identity and purity of isolated FAME were positively confirmed by mass spectrometry by comparison with authentic standards. AS

Lipids

220 Bloch (K). Sterol structure and function. **Journal of the American Oil Chemists" Society** 65(11); 1988; 1763-1766

221 Sattur (AP) and Karanth (NG). Production of microbial lipids by oleaginous yeasts. A review. **Journal of Microbial Biotechnology** 3(1); 1988; 51-63

This review covers oleaginous microorganisms, oleaginous yeasts, lipid composition, mechanism of microbial oil accumulation, biochemistry of lipid formation in oleaginous microorganisms, operational factors influencing the lipid composition and process economics. 66 references. BV

Triglycerides

222 Aronhime (JS), Sarig (S) and Garti (N). Dynamic control of polymorphic transformation in triglycerides by surfactants. The button syndrome. **Journal of the Amerioan Oil Chemists" Society** 65(7); 1988; 1144-1150

The kinetics of polymorphic transformations in mono acid triglycerides and the influence caused by the presence of certain solid surfactants were investigated. MNK

Oils

223 Smiles (A), Kakuda (Y) and MacDonald (BE). Effect of degumming reagents on the recovery and nature of lecithins from crude canola, soybean and sunflower oils. **Journal of the American Oil Chemists" Society** 65(7); 1988; 1151-1155

Six reagents namely, water, citric acid, phosphoric acid, oxalic acid, acetic anhydride and malic anhydride were evaluated for their effectiveness in degumming crude canola, soybean and sunflower oils. The degumming reagents showed different degumming ability with the three crude oils stored. MNK

Palm oils

224 Saleh (MI), Murray (RS) and Chin (CN). Ashing techniques in the determination of iron and copper in palm oil. **Journal of the American Oil Chemists" Society** 65(11); 1988; 1767-1770

A modified method suitable for routine detn. of Fe and Cu in palm oil was developed. The method involves all stages of ashing including charring, ashing and ash dissolution, using fabricated ashing vessels made of pyrex glass that can stand ashing temp. of up to 700 C. The ashed samples were recovered quantitatively after refluxing with nitric acid and collected in the attached round-bottomed flask readied for metals detn. without transfer. The relative standard deviation for the detn. of iron by flame atomic absorption was about 1.0%, whereas for Cu determined by ion selective electrode it was about 0.5%. AS

Rapeseed oils

225 Vadke (VS) and Sosulski (FW). Mechanics of oil expression from canola. **Journal of the American Oil Chemists" Society** 65(7); 1988; 1169-1176

A lab. scale oilseed screw press was used to investigate the effects of shaft speed and choke opening and of seed pretreatment, including moisture conditioning, flanking and pre heating, on the canola (rapeseed) pressing performance. MNK

Safflower oils

226 Miyashita (K) and Takagi (T). Autoxidation rates of various esters of safflower oil and linoleic acid. **Journal of the American Oil Chemists" Society** 65(7); 1988; 1156-1158

Autoxidation rates of five types of safflower oil esters increased in the following order: monoacylglycerol (MG), methyl ester (ME), diacylglycerol (DG), triacylglycerol (TG) and sucrose ester (SE). The differences in autoxidation rate were confirmed by measuring autoxidation of similar esters of linoleic acid. The order of the oxidation rates corresponded to the number of acyl groups per molecule. This relationship was explainable by the idea that intramolecular free radical chain reaction between acyl groups of esters occurs more rapidly than intermolecular chain reaction. The position of acyl groups also affected the oxidation rates of esters in that 1, 3 - dilinolein autoxidized more rapidly than 1, 2-dilinolein. This difference in oxidation rate may result from a closer arrangement of acyl groups in 1, 3 - dilinolein than those in the 1, 2 - isomer. AS

Soybean oils

227 Huang (C-J), Cheung (N-S) and Lu (V-R). Effects of deteriorated frying oil and dietary protein levels on liver microsomal enzymes in rats. **Journal of the American Oil Chemists" Society** 65(11); 1988; 1796-1803

Soybean oil was subjected to a deep-frying process at 205 C for 6 h periods. The resultant oil was incorporated into test diets at a 15% level to study. The effects upon the hepatic microsomal drug metabolising enzyme system. It was concluded that rat hepatic microsomal enzymes are induced by dietary determinated used frying oil and that the level of induction is influenced by dietary protein level. MNK

Sunflower oils

228 Rivarola (G), Anon (MC) and Calvelo (A). Influence of phospholipids on the crystallization of waxes in sunflowerseed oil. **Journal of the American Oil Chemists" Society** 65(11); 1988; 1771-1773

The effect of lecithins on wax crystallization in sunflowerseed oil was studied. The results showed that the presence of lecithins does not modify the nucleation stage, but decreases the crystalline size. Lecithin has a minimal effect on viscosity and does not change the wax/oil equilibrium ratio. It is proposed that the main mechanism of action of lecithin involves the partial adsorption on the surface of the wax crystals interfering with their growth. AS

SPICES AND CONDIMENTS

229 Aitkenhead (P) and Vidnes (A). Simple and accurate method for determination of ethylene chlorohydrin in dried spices and condiments. **Journal of the Association of Official Analytical Chemists** 71(4); 1988; 729-731

A simple and accurate method is described for the detn. of ethylene chlorohydrin (ECH) by using capillary gas chromatography (GC) and flame ionization detection. Acetonitrile-methanol was chosen as the extraction solvent in preference to other solvents because its use reduced the number of compounds detected by the GC systems, thus enabling easier identification and quantitation of ECH. The coeff. of variation for the method is 2.7% at p.p.m., and recovery is good, even for the standard addition of 1 p.p.m. Fifteen different spices and condiments were analyzed using this method; 20% were identified as positive for ECH. The method also identifies the related compound ethylene bromohydrin (EBH). AS

Spices

Capsicum

230 Krajewska (AM) and Powers (JJU). Sensory properties of naturally occurring capsaicinoids. **Journal of Food Science** 53(3); 1988; 902-905

Sensory evaluation of isolated natural capsaicinoids showed that there was a significant linear relationship between pungency and concn. Detection thresholds were evaluated using an ASTM method. Pungency thresholds were calculated using the established relationships between pungency and concn of individal compounds. Total pungency of mixture of capsaicinoids was highly correlated with the sum of pungencies of individual capsacinoids. Determination of the total pungency of **Capsicum** extracts can be accomplished by adding the pungencies of individual capsaicinoids upon multiplication of their pungency threshold values by their respective concn AS

SENSORY EVALUATION

231 Basker (D). Critical values of differences among rank sums for multiple comparisons by small taste panels. **Food Technology** 42(7); 1988; 88-89

232 Ney (KH). Sensograms, a methodological extension of aromagrams. **Gordian** 88(1/2); 1988; 19 (De).

In Aromagrams the combined action of smell, taste and consistency of a food was classified. Adding acoustical and optical impressions leads to sensograms, comprising the whole range of sensory perceptions. AS

FOOD STORAGE

Nil

INFESTATION CONTROL AND PESTICIDES

Pesticides

233 Petersen (B) and Chaisson (C). Pesticides and residues in food. **Food Technology** 42(7); 1988; 59-64

The food industry's role in the evaluation and regulation of pesticides is examined. Covers briefly laws and regulations (Federal Fungicide, Rodenticide, and Insecticide Act (FIFRA) and Federal Food, Drug, and Cosmetic Act (FFDCA), definition of a carcinogen, criteria for acceptable risk, regulation of imported foods, state laws, monitoring and enforcement), the risks of pesticide products, detn. of intrinsic toxic properties, exposure to the pesticide and criteria for regulatory useful data. BV

BIOCHEMISTRY AND NUTRITION

Biochemistry

234 Thompson (DB). Iron binding by ovotransferrin from ferric nitrilotriacetate at pH 5 and pH 5.5. **Journal of Food Science** 53(3); 1988; 929-931

Binding of iron to ovotransferrin (OTf) in egg white at low pH was studied. At pH 5 iron as ferric nitrilotriacetate (FeNTA) bound to only 25% of the OTf iron-binding sites. Although this binding caused a 1 C increase in OTf denaturation temp. enthalpy of denaturation apparently decreased. At pH 5.5, the apo-OTf denaturation temp. was about 4 C higher than at pH 5. FeNTA bound to 40% of the OTf iron-binding sites; again a small increase in denaturation temp. and an apparent decrease in enthalpy was observed. Work with purified OTf suggests that the denaturation enthalpy decrease observed in egg white may be due to overlapping of the OTf and albumin endotherms. AS

Proteins

235 Elizalde (BE), De Kanterewicz (RJ), Pilosof (AMR) and Bartholomai (GB). Physicochemical properties of food proteins related to their ability to stabilize oil-in-water emulsions. **Journal of Food Science** 53(3); 1988; 845-848

The emulsion stabilizing properties of a var. of food protein products in relation to their water (WAC) and oil (OAC) uptakes and the viscosity of the external phase were investigated. Protein products were treated as two entities for regression analysis. Emulsion instability of protein products with a lipophilic water-oil absorption index could be explained and accurately predicted on the basis of the WAC, OAC, and viscosity. Emulsion instability of protein products with a hydrophilic water-oil absorption index could be predicted using WAC and viscosity. High WAC, OAC, and viscosity of protein products were associated with optimum stabilizing properties. AS

236 Lambelet (P), Berrocal (R), Desarzens (C), Froehlicher (I) and Ducret (F). Pulsed low-resolution NMR investigations of protein sols and gels. **Journal of Food Science** 53(3); 1988; 943-946, 964

Water proton transverse (T_2) relaxation measurements in whey, egg, gelatin, and soybean sols and gels were determined. T_2 relaxation in protein sols and gels was a single exponential process, except for oil containing sols which showed a two-phase behaviour. The relaxation rates (T_2) increased linearly with concn of either protein or oil. For samples containing protein which underwent an irreversible denaturation upon heating, T_2 relaxation times were longer in the sols than in the gels. In gels, the variation of the T_2 relaxation times were longer in the sols than in the gels. In gels, the variation of the T_2 relaxation times with temp. was interpreted in terms of an exchange between labile protein protons and water protons. AS

Nutrition

237 Nestel (PJ). Changing nutritional priorities-need for flexibility. **Food Technology in Australia** 40(1); 1988; 17-18, 21

The review discusses changing nutritional priorities and factors influencing need for flexibility. This covers changes in the nature of disease; changing diseases prevalence; changes in patterns of treatment which involve nutrition, changes in the scientific basis of the dietary guidelines and community needs and perceptions. NGKR.

238 Schmidl (MK), Massaro (SS) and Labuza (TP). Parenteral and enteral food systems. **Food Technology** 42(7); 1988; 77-87

eview covers the formulation and processing of foods for medical purposes. Parenteral nutrition, enteral nutrition, regulation of foods for medical purposes and future considerations are also described. BV

TOXICOLOGY

239 Biehl (ML) and Buck (WB). Chemical contaminants. Their metabolism and their residues. **Journal of Food Protection** 50(12); 1987; 1058-1073

The sources, metabolism and residue problems created by various contaminants are reviewed and the factors and therapeutic approaches utilised in alleviating some of the common residues in food animals are outlined. MVG

Mycotoxins

Aflatoxins

240 Farag (RS), El-Leithy (MA), Basyony (AE) and Daw (ZY). Growth and aflatoxin production by **Aspergillus parasiticus** in a medium containing plant hormones, herbicides and insecticides. **Journal of Food Protection** 50(12); 1987; 1044-1047

The effect of some widely used plant hormones (indol-3-acetic acid and gibberellic acid), herbicides (gramoxone, stomp and treflan) and insecticides (malathion, actellic and guthion) on **Aspergillus parasiticus** growth and aflatoxin production in a synthetic medium was studied. Addition of indol acetic acid to the medium increased aflatoxin production more than gibberellic acid. Treflan at 5, 10 and 20 p.p.m. levels caused a highly significant stimulatory effect on **A. parasiticus** growth and aflatoxin production. In contrast, stomp at 10 and 20 p.p.m. produced the reverse effect. Guthion, an insecticide, caused a marked decrease in fungal growth and aflatoxin production. The inhibitory effect of insecticides under study on both fungal growth and aflatoxin production in effectiveness followed the sequence: guthion > actellic > malathion. At the recommended application rate (10 p.p.m.), with the exception of indol acetic acid and treflan, all compounds suppressed mold growth and aflatoxin production. AS

241 Trucksess (MW), Stoloff (L) and Mislivec (PB). Effect of temperature, water activity and other toxigenic mold species on growth of **Aspergillus flavus** and aflatoxin production on corn, pintobeans and soybeans. **Journal of Food Protection** 51(5); 1988; 361-363

The influence of extrinsic factors like temp., water activity and the presence of other toxigenic molds on growth and aflatoxin production in corn, pintobeans and soybeans has been reported. No aflatoxin was produced at 16 C incubation either by native or added strain of **A. flavus**, however growth was evident at this temp. and at low water activity values (0.80, 0.77, 0.85) on corn soybeans, and pintobeans resp. Incubation temp. of 26 and 32 C and water activity values in the range of 0.85 = 0.89 was found to be optimum for toxin synthesis. Limiting water activity values for mold growth at 26 and 32 C were 0.73, 0.69 and 0.75 for corn, soybeans, and pintobeans resp. Substrate suitability at limiting temp. and water activity levels is not a factor in the observed differences in the risk of aflatoxin contaminations for these commodities. Exposure to associated microflora during mold invasion is a risk determinant. CTD

Pesticide residues

242 Cantoni (C), Fabbris (F), Rogledi (R) and Campagnari (A). Levels of organochlorine pesticides and PCBs in foods of animal origin. **Industrie Alimentari** 27(256); 1988; 6-8 (It).

FOOD LAWS AND REGULATIONS

243 Todd (ECD). Legal liability and its economic impact on the food industry.' **Journal of Food Protection** 50(12); 1987; 1048-1057

GENERAL

244 Osnabrugge Van (W). Healthy foods, done in the best possible taste. **Cereal Foods World** 33(7); 1988; 564, 566-568

The trends in the production and consumption of healthy foods in the Western Countries are focussed in this article. The healthy foods such as reduced fat foods, high fibre foods, low sodium foods, reduced caffeine beverages, low cholesterol foods and reduced calorie foods accounting to the value of 30 billion dollars were estimated to be consumed in the United States market. In the development of healthy foods, the author stresses the importance of flavours in improving the acceptability of such products. PHR

FOOD PROCESSING

Nil

FOOD PACKAGING

245 Kral (AH), Zall (RR) and Prusik (T). Use of remote communications to transmit product quality information from polymer-based time-temperatue indicators. **Dairy and Food Sanitation** 8(4); 1988; 174-176

The study reports the results of using an indicating devise based on computerized lifelines inventory management system to determine rate of food quality deterioration. This devise not only measure temp. exposure, but can also be used to predict product quality. The system consists of time-temp. colour changing polymer strip which can be attached to a packaged product or shipping container and goes through irreversible colour change as a result of accumulated temp. exposure, which can be read and stored by microcomputer equipped with optical scanning ward. The devise has been sucessfully employed to measure quality of both semi-perishable and perishable foods. CTD

246 Nicholson (EG) and O'Dwyer (P). Developments in steel packaging. **Food Technology in Australia** 40(3); 1988; 89-91

This article describes various aspects of developments in steel packaging with particular reference to developments in tinplate manufacture, can making developments and the future scope for developments in steel packaging. NGKR

247 Read (MJ). Performance testing of snack packaging. **Food Technology in Australia** 40(3); 1988; 92-93

In this article the requirements for effective performance of flexible packaging to obtain max. shelflife and min. pack failure rates have been discussed with particular reference to roasted groundnut seeds. It also covers film tests and specifications, measurement of stability and rancidity, gas packaging and initial changes, significance of good abuse resistance to use-by date, pack performance testing by organoleptic assessment pack oxygen content, product peroxide value and in certain cases moisture which were found to be the most useful tools for such performance quality assurance. NGKR

248 Sacks (B) and Gore (A). Gas packaging. Techniques and trends. **Food Technology in New Zealand** 23(1); 1988; 19-21

This reivew describes various techniques and trends in packaging food with particular reference to gas packaging in atm. other than air in order to protect and preserve products and extend their shelflife. This covers food spoilage mechanisms, gas packaging techniques, systems approach to gas packaging, food product considerations, storage and temp. considerations, gases and gas technology, packaging materials, modified atm. packaging, controlled atm. packaging, material permeability linked directly to metabolic category. The "mother bag" concept, packaging equipment, vacuum flushing, straight flushing chamber packaging equipment, and multivac Rollstock, vacuum/flush packaging equipment. NGKR

Packaging materials

Polystyrene

249 Hempel (G) and Rudt (U). Determination of monomeric volatile portions in polystyrene and styrene blending and grafting polymerizates. **Deutsche Lebensmittel-Rundschau** 84(8); 1988; 239-242 (De).

FOOD ENGINEERING AND EQUIPMENT

250 Sastry (SK), Li (SF), Patel (P), Konanayakam (M), Bafna (P), Doores (S) and Beelman (RB). A bioindicator for verification of thermal processes for particulate foods. **Journal of Food Science** 53(5); 1988; 1528-1531, 1536

A bioindicator was developed for verification of heat-hold-cool thermal processes for particulate foods. Spores of **B. stearothermophilus** were infused and immobilized within individual mushrooms using alginate gels. The particles were then made shelf-stable by freeze-drying. Results showed that thermal responses of bioindicator particles were similar to those for real particles; spores were successfully infused into the particle cold-zones; and that spores were retained within particles through reconstitution and blanching. Results on thermal processing showed that these particles might be potentially useful indicators of sterility in continuous aseptic systems. **AS**

ENERGY IN FOOD PROCESSING

Nil

FOOD CHEMISTRY AND ANALYSIS

Chemistry

251 Anon. Nitrate, nitrite and nitroso compounds in foods. **Food Technology in Australia** 40(3); 1988; 100-105

This article describes the scientific status summary by the Institute of Food Technologists, Expert Panel on Food Safety and Nutritions with particular reference to the role of nitrate, nitrite and nitroso compounds in foods. This also covers history of meat curing, regulation of the curing process, chemistry of curing, microbiology of nitrite, substitutes for nitrite, chemistry of nitrosation, biological activity of nitroso compounds major, survey of foods, sources of nitrosamines in foods, nitrosamine formation during food processing, packaging and indirect addition, formation of nitroso compounds in the body, nonvolatile nitroso compounds in foods and conclusions. NGKR

252 Buckholz (LLJr). The role of Maillard technology in flavouring food products. **Cereal Foods World** 33(7); 1988; 547-548, 550-551

The author in this review paper, has dealt with history of Maillard reaction, mechanism of non-enzymatic browning reaction the work on model systems and important Maillard compounds. The author stresses the importance of Maillard technology in modernization of continuous extrusion and toasting of cereal products for obtaining products with desired flavours as compared to that made in batch operations. This technology could be conveniently used to develop microwave bread systems providing both aroma, flavour and the browning needed to duplicate in conventional ovens. PHR

253 Favati (F), king (JW), Friedrich (JP) and Eskins (K). Supercritical carbon dioxide extraction of carotene and lutein from leaf protein concentrates. **Journal of Food Science** 53(5); 1988; 1532-1536

Supercritical fluid carbon dioxide was used to extract carotene and lutein from leaf protein conc. (LPC). Extractions were preformed using pressures of 10-70 MPa at 40 C and carbon dioxide flow rates of 5-6 L/min. Over 90% of the carotene contained in LPC was removed at extraction pressures in excess of 30 MPa. Removal of lutein from LPC required higher extraction pressures (70 MPa) and gas volumes to attain a 70% recovery level. Experimental results were rationalized with the aid of solubility parameter theory. The described process offers the possibility of obtaining a selective extraction of natural colourants, free of solvent residuals, which can be used as food dyes. AS

254 Pesek (CA) and Warthesen (JJ). Characterization of the photodegradation of Beta-carotene in aqueous model systems. **Journal of Food Science** 53(3); 1988; 1517-1520

The photodegradation of Beta-carotene in model dispersions was studied to gain a better understanding of carotene stability in foods. Aqueous dispersions were exposed to 250 ft-c of light at varied times and temp. Analysis was by HPLC and spectrophotometry. Degradation reactions fit a first-order kinetic model. Temp., physical scale and Beta-carotene microenvironment had some influence on degradation rates. cis-isomers of Beta-carotene were present and the relative amounts of cis-isomers increased with time of exposure. AS

255 Tan (C-T) and Wu Holmes (J). stability of beverage flavour emulsions. **Perfumer & Flavorist** 13(1); 1988; 23-28, 30, 34, 37, 3

Discusses the application of colloidal chemistry principles to solve the problems of producing a stable emulsion factors influencing emulsion stability, the particle size distribution in the emulsion, density balance of the two phases, adsorption of solid film at interfaces and electrostatic charges on the droplets. BV

256 Whitelaw (ML) and Weaver (CM). Maillard browning effects on **In vitro** availability of zinc. **Journal of Food Science** 53(5); 1988; 1508-1510

Chemistry(Analytical)

257 Kim (H-J) and Kim (Y-K). Analysis of ascorbic acid by ion exclusion chromatography with electrochemical detection. **Journal of Food Science** 53(5); 1988; 1525-1527

A highly sensitive and specific HPLC method for the analysis of ascorbic acid in foods and beverages was developed. Ascorbic acid was extracted with 0.1 M sulphuric acid 0.01% EDTA solutions, separated on an anion exclusion column and detected amperometrically with a platinum electrode operating at + 0.6 V vs Ag/AgCl reference electrode. Excellent correlation was observed among results obtained by ion exclusion chromatography with either electrochemical or UV detection and by the AOAC 2, 6-di-chloroindophenol titrimetric method. Ion exclusion chromatography with electrochemical detection was more sensitive and specific for ascorbic acid than the other two methods. AS

258 Lawrence (JF) and Chadha (RK). Determination of sulphite in foods by headspace liquid chromatography. **Journal of the Association of Official Analytical Chemists** 71(5); 1988; 930-933

Sulphate was determined in a var. of foods by liquid chromatography (LC) after the samples were mixed with a solution containing mannitol, ferrous sulphate, and sodium orthophosphate, adjusted to pH 11, and left to stand for 15 min at room temp. An aliquot of the mixture was placed in a headspace vial and mixed with 50% orthophosphoric acid. After 15 min, a portion of the headspace was removed with a syringe containing LC mobile phase without acetonitrile. The syringe was shaken and an aliquot of the solution was analyzed on an anion exchange column with a mobile phase of 0.03 M methane sulphonate (pH 10.8) containing 5% acetonitrile. Sulphite was detected amperometrically (glassy carbon electrode) at + 0.7 V. The method was successfully compared to the FDA-modified Monier-Williams procedure for a var. of foods. Minimum detectable levels were about 1 µ g/g, based on a 15 g samples. AS

259 Lawrence (JF) and Charbonneau (CF). Determination of seven artificial sweeteners in diet food preparations by reverse-phase liquid chromatography with absorbance detection. **Journal of the Association of Official Analytical Chemists** 71(5); 1988; 934-937

The artificial sweeteners aspartame, saccharin, cyclamate, alitame, acesulfam-K, sucralose, and dulcin are determined in diet soft drinks and tabletop sweetener preparations. Samples are diluted, filtered, and analyzed directly by liquid chromatography on a C-18 reverse-phase column with a mobile phase gradient ranging from 3% acetonitrile in 0.02M potassium dihydrophosphate (pH 5) to 20% acetonitrile in 0.02M potassium dihydrophosphate (pH 3.5). Diet puddings and dessert toppings are extracted with ethanol, filtered, and diluted with mobile phase for analysis. The sweeteners, except sucralose and cyclamate, were detected by UV absorbance at either 200 or 210 nm. Sucralose was determined at 200 nm or by refractive index. Cyclamate was determined after post-column ion-pair extraction. The sweeteners stevioside and talin were not detected. Additives such as caffeine, sorbic acid, benzoic acid did not interfere. AS

260 Makkar (HPS), Dawra (RK) and Bhupinder Singh). Determination of both tannin and protein in a tannin-protein complex. **Journal of Agricultural and Food Chemistry** 36(3); 1988; 523-525

A method for detn. of both protein precipitation capacity of tannins and protein-precipitable phenolics and the ratio of protein to tannin in a tannin-protein complex is presented. The relationships of both bovine serum albumin (BSA) precipitated and the protein-precipitable phenolics with tannic acid and the ratio of BSA and tannins in the protein tannic acid complex agreed well with those obtained from the methods already available. The above parameters were also determined for **Quercus incana** leaves at different stages of maturation. The protein precipitation capacity and protein-precipitable tannins decreased substantially with maturation, whereas the ratio decreased slightly. As the present method allows detn. of these parameters from a tannin-protein complex, it is convenient, takes less time, can handle a large number of samples at a time, and requires less tannin-containing extracts and chemicals compared to other available methods. AS

261 Sadler (GD), Roberts (J) and Cornell (J). Determination of oxygen solubility in liquid foods using a dissolved oxygen electrode. **Journal of Food Science** 53(5); 1988; 1493-1496

262 Sheen (SJ). Detection of nicotine in foods and plant materials. **Journal of Food Science** 53(5); 1988; 1572-1573

Nicotine at several p.p.m. was detected in the dehydrated fresh produce of the Solanaceae sp. including tomato, potato peel, egg plant and green pepper. Its identity was verified by GLC, TLC and GC-mass spectrometry. The presence of nicotine in all parts of the tomato plant suggested biosynthetic origin. In contrast, the 2 to 23 p.p.m. nicotine found in green tea and instant tea samples might be attributed to insecticide contamination. There was no detectable level of nicotine in non-Solanaceae fruit and vegetables and other processed foods analyzed. AS

FOOD MICROBIOLOGY AND HYGIENE

263 Coppola (K) and Firstenberg-Eden (R). Impedance based rapid method for detection of spoilage organisms in UHT low-acid foods. **Journal of Food Science** 53(5); 1988; 1521-1524, 1527

An impedance procedure was developed for rapid screening of low acid foods. Impedance Medium was used during the pre-enrichment step and the capacitance monitoring stage using the Bactometer. Thermophiles and mesophiles were detected by incubating at 55 C and 35 C. Anaerobes were detected by either placing the Bactometer in an anaerobic chamber or adding an oxygen reducing membrane fraction directly to the medium. Naturally contaminated foods containing approx. 10^4 CFU/g resulted in detections within 8 h. Artificially contaminated products with 10^1 CFU/g resulted in detections within 24 h (6 h pre-enrichment inclusive). This procedure screened low-acid foods within 24 h, faster than the conventional methodology. AS

Enzymes

264 Hayashi (T), Akiba (T) and Horikoshi (K). Properties of new alkaline maltohexaose forming amylases. **Applied Microbiology and Biotechnology** 28(3); 1988; 281-285

Three alkaline amylases have been newly discovered in a culture medium of an alkalophilic **Bacillus** sp. H-167 isolated from soils. These amylases produced maltohexaose as the main product from starch. All three amylases were purified to give a single band on disc electrophoresis. They had similar properties except for mol. wt. (MW) and isoelectric point (pI): optimum pH, 10.5; optimum temp., 60 C; pH stability, 7-12; heat stability, 50-55 C; MW 59000-80 000; pI 3.5-4.3. Metal ions such as Hg^{2+}, Zn^{2+}, Pb^{2+}, Co^{2+} and Ni^{2+} inhibited the enzyme activity. All the enzymes hydrolyzed starch to produce preferentially maltohexaose, rather than maltose and maltotetrase, in an early stage of the reaction. The yield of maltohexaose reached 25% -

30% from soluble starch. **AS**

Ethyl alcohol

265 Dellweg (H) and Luca (SF). Ethanol fermentation. Suggestions for process improvements. **Process Biochemistry** 23(4); 1988; 100-104

This paper describes some developments in the process technology of ethanol fermentation by which the energy demand may be reduced significantly preprocessing of starch containing materials may be appreciably improved by the application of a high speed homogenizer. 90% reduction of the energy demand has been achieved by optimised saccharification process using higher most concn. and/or lower temp. By using a special ethanol resistant yeast it gave ethanol yields of 95% at 40 C and a fermentation rate 0.75g ethanol g dry matter)$^{-1}$ h^{-1} which is nearly twice the value obtained with other distillers yeasts. A two stage continuous fermentation process with cell recycling is being developed its energy aspects have been discussed in this paper. NGKR

266 Koutinas (AA), Kanellaki (M), Lykourghiotis (A), Typas (MA) and Drainas (C). Ethanol production by **Zymomonas mobilis** entrapped in alumina pellets. **Applied Microbiology and Biotechnology** 28(3); 1988; 235-239

Zymomonas mobilis cells were immobilized on pellets of alumina by entrapment based on electrostatic forces. Entrapped cells produced 52 g/l^{-1} ethanol every 24 h for many successive fermentation batches, when inoculated in batch synthetic media containing 12% glucose. It was shown that the rate of growth, ethanol production and glucose utilization increased when alumina was added in the growth medium. This increase was dependent upon the concn of alumina. The optimum conditions for immobilization of **Z. mobilis** on alumina were established. Reduction in productivity and yield was not observed for up to 15 successive fermentation batches using the same entrapped cells. **AS**

Microorganisms

267 Fung (DYC), Cox (NA) and Bailey (JS). Rapid methods and automation in the microbiological examination of foods. **Dairy and Food Sanitation** 8(6); 1988; 292-296

The review covers latest developments that have taken place in the lost 15 yrs. in the area of rapid methods and automation systems in the microbiological examination of foods. The approaches have been, 1) Minuturization of conventional procedures and development of diagnostic kits, 2) Modification of viable cell count procedures and 3) Development of alternative approaches for the estimation of microbial populations. CTD

268 Mason (JC), Richards (M), Zimmermann (W) and Broda (P). Identification of extracellular proteins from actinomycetes responsible for the solubilization of lignocellulose. **Applied Microbiology and Biotechnology** 28(3); 1988; 276-280

We have utilized strains of three actinomycete sp., **Actinomadura** sp. **Streptomyces cyaneus** and **Thermomonospora mesophila**, to study the solubilisation of lignocellulose. The production of extracellular proteins was measured for each of the organisms during 17 days growth using medium containing either glucose or ball-milled straw. Some of the extracellular proteins (as identified by SDS gel electrophoresis) were present under both growth conditions, but other were specific to the type of medium or the period of incubation. The levels of proteins were compared with the abilities of the extracellular protein preparations to solubilise a substrate of ^{14}C-labelled lignocellulose. About 6% of the radioactive material were solubilised when the extracellular proteins from the cultures grown on glucose were incubated with the substrate, compared to 20-30% that were solubilised by the extracellular proteins from the cultures grown on ball-milled straw. Partial characterisation of an enzyme from **Str. cyaneus** responsible for the solubilisation of lignocellulose was achieved by gel filtration of the extracellular proteins, using Supersoe 12. Material that eluted from the column with an apparent mol. wt. of about 20000 accounted for all of the solubilisation of ^{14}C-labelled (i.e. lignin-derived) moieties. In contrast, when the eluate was tested for the presence of cellulases and xylanases most of the activities were found in fractions containing materials with an apparent mol. wt. of about 45 000. We conclude that in cultures of **Str. cyaneus** grown on ball-milled straw, a single extracellular enzyme is responsible for the solubilisation of lignin in lignocellulose, and that this enzyme is unlikely to be a cellulase or a xylanase. AS

269 Oppong (D) and Snudden (BH). Comparison of acridine orange staining using fluorescence microscopy with traditional methods for microbiological examination of selected dry foods. **Journal of Food Protection** 55(6); 1988; 485-488

A comparison was made between the acridine orange stain, gram stain and methylene blue stain for direct microscopic counts (DMC) of microorganisms in gravy mixes, spices, cocoa products and baby foods. Bacteria were detected in 96% (45/47) of the samples stained with acridine orange, 64% (30/47) for the gram stain and 66% (31/47) for the methylene blue stain. In most instance, acridine-orange smears showed higher numbers of bacteria than the traditional stains. The staining quality of the acridine orange was better than the conventional stains with bacteria, yeast cells, and mold hyphae fluorescing very differently from the background. The results indicate that direct staining with acridine orange is better than the traditional methods for estimating bacterial numbers in such foods. AS

270 Specchio (JJ), Karmas (E), Daun (H), Paik (S) and Gilbert (G). Effect of gaseious atmosphere on the state of water in collagen influencing microbial growth. **Journal of Food Science** 53(5); 1988; 1503-1507

The effects of carbon dioxide and nitrogen atm. on the thermodynamic state of water influencing microbial response in collagen was studied by generating sorption isotherms by inverse gas chromatography and the static method and calculating thermodynamic parameters of sorption. Carbon dioxide atm. significantly increased water sorption by collagen at 25, 30, and 35 C compared to nitrogen and helium. The average binding energies of collagen were significantly increased by carbon dioxide as shown by larger negative Gibb's free energy (Delta G_S), isoteric enthalpy sorption (Delta H_S) and entropy of sorption (Delta S_3) values. Water clustering in collagen appeared at a higher water activity in carbon dioxide gas as compared to nitrogen and helium treated atm. at 25, 30, and 35 C. **AS**

Bacteria

Bacillus subtilis

271 Riedel (K), Renneberg (R), Kohn (M) and Scheller (F). A fast estimation of biochemical oxygen demand using microbial sensors. **Applied Microbiology and Biotechnology** 28(3); 1988; 316-318

Microbial amperometric sensors for biochemical oxygen demand (BOD) detn. using **Bacillus subtilis** or **Trichosporon cutaneum** cells immobilized in polyvinylalcohol have been developed. These sensors allow BOD measurements with very short response times (15-30 s), a level of precision of plus or minus 5% and an operation stability of 30 days. A linear range was obtained for a **B. subtilis** based sensor up to 20 mg/l BOD and for a **T. cutaneum** based sensor up to 100 mg/l BOD using a glucose/glutamic acid standard. **AS**

Bacillus thuringiensis

272 Selinger (LB), Dawson (PSS) and Khachatourians (GG). Behaviour of **Bacillus thuringiensis** var. Kurstaki under continuous phased cultivation in a cyclone fermentor. **Applied Microbiology and Biotechnology** 28(3); 1988; 247-253

Growth, sporulation, insecticidal crystalline protein (ICP) production and plasmids of **Bacillus thuringiensis** var. Kurstaki (HD-1) were investigated during batch and continuous phased cultivation using a lab. scale cyclone fermentor. When grown in batch culture at 28 C, 93% of the cells sporulated and produced ICP within 10 h of commencement of stationary phase. The batch culture runs were completed within 50 h of inoculation. A predominantly sporogenous and crystalliferous cell population of culture harvested from the first 10 to 25 cycles of continuous phased cultivation. In contrast, after 25 or more cycles of cultivation the population in the continuous phased culture shifted towards a predominantly asporogenous and acrystalliferous one. Culture conditions in continuous phased cultivation did not affect the plasmid content of **B. thuringiensis** (HD-1), yet influenced sporulation and plasmid-coded ICP production. **AS**

Escherichia coli

273 Shimizu (M), Fitzsimmons (RC) and Shuryo Nakai). Anti- **E. coli** immunoglobulin Y isolated from egg yolk of immunized chickens as a potential food ingredient. **Journal of Food Science** 53(5); 1988; 1360-1366

Active immunoglobulin (IgY) was isolated from egg yolk of chickens immunized with formalin-treated **E. coli**. The antibody activity was measured by enzyme-linked immunosorbent assay using **E. coli** lipopolysaccharide as an antigen. The anti-**E. coli** IgY aggregated the bacterial cells and inhibited their growth **in vitro**. IgY was relatively heat-stable without loss in antibody activity by pasteurization. IgY was stable at pH above 4, but was more susceptible to pepsin than bovine IgG, while appreciable activity was retained by IgY after trypsin and chymotrypsin-digestion. It appears possible, therefore, to use IgY for the fortification of food products, especially infant formulae. AS

Salmonella typhimurium

274 Airoldi (AA) and Zottola (EA). Growth and survival of **Salmonella typhimurium** at low temperature in nutrient deficient media. **Journal of Food Science** 53(5); 1988; 1511-1513

The growth and survival of two strains of **Salmonella typhimurium** in nutrient-deficient media at 7 C were studied. Cultures were propagated at 37, 24, or 7 C in tryptic soy broth (TSB), inoculated into optimal, minimal and nutrient-deficient media (TSB, 1% TSB; 1.0% , 0.1% and 0.01% peptone water; 0.1% and 0.01% nonfat dry milk; and 30% glycol with and without 0.1% added milk solids) and incubated at 7 C. Numbers at 7 C declined initially when first propagated at 37 C. No decline was seen when propagated at the lower temp. (24 and 7 C). **S. typhimurium** survived in all media for extended periods; one strain survived for more than 1 y at 7 C in 0.1% peptone water and TSB. AS

Sporolactobacillus

275 Holzapfel (WH) and Botha (SJ). Physiology of **Sporolactobacillus** strains isolated from different habitat and the indication of **in vitro** antagonism against **Bacillus** species. **International Journal of Food Microbiology** 7(2); 1988; 161-168

In an ecological study only low numbers of **Sporolactobacillus** were found in habitats such as the faeces of herbivores, the rumen of cattle and the final waste water of an abattoir. Their presence in the final waste water of an abattoir indicates their possible association with food, and more specifically, with meat. Difference were found in some physiological characteristics. One isolate (L2404) differed from the authentic **Sporolactobacillus** ATCC 15538 by its inability to ferment inulin, its growth in presence of 6.5% NaCl and in 0.2% tellurite, by the isomer(s) of lactic acid produced and the mol% G+G in the DNA. One **Sporolactobacillus** isolate (L2470) showed antagonism against **Bacillus cereus**, **Bacillus cereus** var. **mycoides** **Bacillus megaterium** and **Bacillus subtilis**. AS

Fungi

Aspergillus niger

276 Chung (BH) and Chang (HN). Aerobic fungal cell immobilization in a dual hollow-fiber bioreactor. Continuous production of a citric acid.

Biotechnology and Bioengineering 32(2); 1988; 205-212

Aspergillus niger B60 was immobilized in a dual hollow fiber bioreactor (DHFBR) to produce citric acid continuously. The fungi proliferated well in the interstitial region formed by a parallel arrangement of three microporous polypropylene hollow fibers contained within a silicone tube. Long-term operation with nitrogen-enriched medium was not possible due to expansion of the silicone tubes by continual cell growth. The fungal growth could be controlled by supplying a nitrogen-deficient medium at the production stage. With pure oxygen aeration and nitrogen-deficient medium, volumetric productivity reached 1.62 g/L h at a residence time of 4.02 h, which corresponded to a 27 fold increase over that of shake-flask fermentation. When the residence time was increased to 20.1 h, citric acid at a concn. of 26 g/L was continuously produced, with a yield of 80-90% and a volumetric productivity of 1.3 g/L h. This represents a significant improvement in final concn, yield, and the volumetric productivity over the equivalent values of the corresponding batch fermentation, which were 18 g/L, 40%, and 0.06 g/L, resp. AS

277 Dawson (MW), Maddox (IS), Boag (IF) and Brooks (JD). Application of fed-batch culture to citric acid production by **Aspergillus** niger. The effects of dilution rate and dissolved oxygen tension. **Biotechnology and Bioengineering** 32(2); 1988; 220-226

Studies in conventional batch culture confirmed that the max. citric acid production rate occurred prior to exhaustion of the growth-limiting nutrient. i.e., when the growth rate was nonzero. The effects of dilution rate and the culture dissolved oxygen tension (DOT) were studied in chemostat culture. Max. citric acid yield and production rate were observed at low dilution rate (0.017 h^{-1}) and high DOT value (90% of saturation). These findings were applied to a nitrogen-limited fed batch culture, and allowed a productivity increase of 100% when compared with conventional batch culture. AS

278 Xu (WQ) and Hang (YD). Roller culture technique for citric acid production by **Aspergillus** niger. **Process Biochemistry** 23(4); 1988; 117-118

This investigation was carried out to determine the feasibility of culturing **A. niger** NRRL 567 on the solid substrate, apple pomace, in roller culture reactors to produce citric acid. It was found that the rates of sugar consumption and citric acid production during solid substrate fermentation were strongly affected by (1) the wt. of the substrate contained in the roller culture reactor (2) the rotation rate of the reactor (3) the fermentation temp. (4) the inoculum size. Under optimum conditions the technique produced greater than 100g. Citric acid per kg apple pomace fermented. NGKR

Mushrooms

279 Konanayakam (M) and Sastry (SK). Kinetics of shrinkage of mushrooms during blanching. **Journal of Food Science** 53(5); 1988; 1406-1411

Kinetics of shrinkage of mushroom tissue and whole mushrooms was investigated. Shrinkage of tissue was found to be described by three apparent first order reactions, consisting of an initial slow phase, a second rapid phase, and third slow phase. The duration of each phase depended on temp. The major part of the shrinkage took place during the rapid shrinkage period. Activation energies during this phase were 18.25 Kcal mol and 16.80 Kcal mol for mass and volume shrinkage, resp. Results for whole mushrooms were consistent with those for tissue. AS

280 Manu-Tawiah (W) and Martin (AM). Nitrogen sources and the growth response of Pleurotus ostreatus mushroom mycelium. **Canadian Institute of Food Science and Technology Journal** 21(2); 1988; 194-199

281 Stijve (T) and Diserens (H). Content of urea in edible mushrooms. **Deutsche Lebensmittel-Rundschau** 84(8); 1988; 248-252 (De).

Seventy three species (242 samples) of wild growing and cultivated edible mushrooms were analysed for urea using enzymatic and thin layer chromatography methods. The contribution of urea and of other N compounds such as free amino acids, amines, choline and hydrazine derivatives to the total protein content is briefly discussed. Results indicate that the detn. of urea can be most helpful in detecting adulteration of mushroom preserves. BV

Yeasts

282 Deak (T) and Beuchat (LR). Evaluation of simplified and commercial systems for identification of food-borne yeasts. **International Journal of Food Microbiology** 7(2); 1988; 135-145

Three commercial identification kits (APIZOC, Yeast-Ident and API-Zym) were compared with a simplified conventional system developed earlier by the authors for identifying seventy two yeast isolates from sweet fresh corn. Their simplified system failed to identify two isolates. Of the twenty sp. identified only eleven were included in the APIZOC profile index. Three isolates were identified with 100% accuracy at the sp. level, while an additional three were identified at the genus level with the APIZOC system. Other strains were identified at 0 to 44% accuracy. The lacunae in this system was in the absence of three tests important in the characterisation of food yeasts: viz, urease, fermentation of glucose and assimilation of nitrate. With the Yeast-Ident enzyme kit, only four isolates gave 75 to 85% appropriate reactions; the performance of enzyme reactions was misleading and inaccurate. Improvements have been suggested by the authors for adopting the commercial systems to identify food-borne yeasts accurately and easily. NK

283 Quain (DE). Studies on yeast physiology-impact on fermentation performance and product quality. **Journal of the Institute of Brewing** 94(5); 1988; 315-323

The physiology of brewing yeast is of pivotal importance in securing and maintaining beer quality. Fundamental studies on aspects of yeast physiology are critically evaluated. Areas considered include alternative approaches to yeast propagation and methods for strain differentiation. The proposed role of glycogen in fuelling lipid synthesis and other early events in fermentation is discussed, as are methods for measurement of this reserve polysaccharide. As an extension of this work, a new and novel approach to the improved control of fermentation is described. The interaction between yeast physiology and beer flavour is considered. Evidence is presented that the synthesis of higher alcohols and volatile esters contribute to the regulation of intermediary metabolism in yeast during fermentation. AS

284 Sorrels (KM) and Leonard (B). Mechanism of acid tolerance by a yeast isolated from spoiled ketchup. **Journal of Food Protection** 51(6); 1988; 489-490

A yeast, isolated from spoiled ketchup, grew at a relatively high (0.8%) concn. of acetic acid. The addition of specific metabolic inhibitors in sub-lethal concn. to acidified Potato Dextrose broth was used to study the mechanism of resistance of the yeast to acid. Growth in non-acidified medium was not affected by most inhibitors and to a limited extent by DNA and RNA inhibitors. Growth in the acidified medium was affected only slightly by the presence of inhibitors of protein (mitochondrial), DNA and RNA synthesis, 2,4-dinitrophenol and D-cycloserine were the only inhibitors that inhibited growth in acidified media, suggesting acid tolerance involves an energy requiring system as well as cell walls, possibly transport. AS

Baker's yeast

285 Sweere (APJ), Matta (YA), Zandvliet (J), Luyben (KChAM) and Kossen (NWF). Experimental simulation of glucose fluctuations. Influence of continually changing glucose concentration on the fed-batch baker's yeast production. **Applied Microbiology and Biotechnology** 28(2); 1988; 109-115

In a two fermentor-system the influence of continually changing glucose concn on the fed-batch baker's yeast production was investigated. Experiments were carried out at different circulation rates and different ratios of the fermentor volumes. The imperfect mixing of the system caused a reduction of the biomass yield and an increase in the ethanol formation. Acetic acid and glyerol were produced as well, but no clear relationship between the circulation rate and the amount of metabolites formed could be observed. The difference in performance of the culture in both fermentors was exposed clearly by the respiration quotient and the (max.) specific oxygen consumption rate. BV

Hansenula polymorpha

286 Giuseppin (MLF), Van Eijk (HMJ), Bos (A), Verduyn (C) and Van Dijken (JP). Utilisation of methanol by a catalase - negative mutant of Hansenula polymorpha. **Applied Microbiology and Biotechnology** 28(3); 1988; 286-292

In methanol-utilizing yeasts, catalase is an essential enzyme for the destruction of hydrogen peroxide generated by methanol oxidase (E.C. 1.1.3.13). It was found however that a catalase-negative mutant of **Hansenula polymorpha** is able to consume methanol in the presence of glucose in continuous cultures. At a dilution rate of 0.1 h^{-1}, stable continuous cultures could be obtained during growth on methanol/glucose mixtures with a molar ratio of methanol/glucose between 0 to 2.4. In these cultures methanol oxidase was induced up to a level of 40% of that obtained in the wild-type strain. The hydrogen peroxide decomposition activity of the mutant was studied in more detail by pulsing methanol to samples of steady-state cultures. Only after the addition of excess methanol the hydrogen peroxide-decomposing system became saturated, and the cells excreted hydrogen peroxide. This was accompanied by excretion of formaldehyde and rapid loss of viability. The presence of extracellular catalase during a methanol pulse prevented the loss of viability. The nature of the alternative hydrogen peroxide-decomposing enzyme system remains to be elucidated. Its capacity strongly depended on the cultivation conditions and pretreatment of the cells. Cells grown on formaldehyde/glucose mixtures showed a lower methanol tolerance than those grown on the methanol/glucose mixtures. Freeze-drying of cells drastically enhanced the excretion of hydrogen peroxide, probably as a result of an inactivation of the decomposing system. AS

Saccharomyces cerevisiae

287 Brigidi (P), Matteuzzi (B) and Fava (F). Use of protoplast fusion to introduce methionine overproduction into **Saccharomyces** cerevisiae. **Applied Microbiology and Biotechnology** 28(3); 1988; 268-271

DL-Ethionine-resistant mutants of **Saccharomyces uvarum** ATCC 26602 were found to overproduce exogenous-L-methionine. DL-Ethionine-resistant mutant ER 108, carrying a mutation to chloramphenicol resistance, was converted to petite form, and protoplasts obtained from it were fused with protoplasts from antibiotic-sensitive Sacch. cerevisiae X2928 carrying six auxotrophies. The resulting fusants maintained four auxotrophies and were capable of overproducing L-methionine. These fusants were stable after ten passages on complete medium. AS

288 Sweere (APJ), Giesslbach (J), Barendse (R), de Krieger (R), Honderd (G) and Luyben (KCAM). Modelling the dynamic behaviour of **Saccharomyces cerevisiae** and its application in control experiments. **Applied Microbiology and Biotechnology** 28(2); 1988; 116-127

A simple structured model describing the response of a baker's yeast culture to a glucose pulse is presented. The model is based on a limited oxidation capacity of yeast leading to a switchover from oxidative to oxido-reductive metabolism. The max. specific consumption rates of glucose, ethanol and oxygen are modelled by first order transfer functions. These max. rates have also been estimated experimentally as a function of the dilution rate in a continuous culture. The rates predicted by the model correspond to the measured max. specific consumption rates. So, the model can describe a continuous culture of baker's yeast very well. The applicability of the model is tested by inserting it in a control loop and comparing the response of the model with the results of a controlled fermentation. The model behaved satisfactorily for the description of the pulse experiment as well as during the simulation of the control experiments. Although the model for balanced growth was rejected in simulating pulse responses, its results were convenient when inserted in a control loop. **AS**

Hygiene

289 RFMCCNFPA. Factors to be considered in establishing good manufacturing practices for the production of refrigerated foods. **Dairy and Food Sanitation** 8(6); 1988; 288-291

The paper points to the fact that proper refrigeration alone does not guarantee safety from nonproteolytic types of **Clostridium botulinum, Yersinia enterocolitica, Listeria monocytogens** and **Aeromonas hydrophila** which can grow at 38 F. The committee recommends that one or more of safety factors - also called (a safety factor of a physical, biological or chemical nature which retards or prevents the growth of microorganisms including those which may be infectious or toxigenic) barriers be introduced in addition to refrigeration. The Hazard Analysis of Critical Control Points (HACCP) has been suggested to assure quality and safety of refrigerated foods. The HACCP concept has to be used for ingredients, in product development, processing, and packaging. CTD

Listeria monocytogenes

290 Herald (PJ) and Zottola (EA). Attachement of **Listeria monocytogenes** to stainless steel surfaces at various temperatures and pH values. **Journal of Food Science** 53(5); 1988; 1549-1552, 1562

The attachment of **Listeria monocytogenes** isolates Scott A and Jalisco cheese to stainless steel surfaces at 35, 21 and 10 C was investigated using scanning electron microscopy (SEM). Cells were found to adhere at all three temp., but cells with fibrils were observed only at 21 C. When grown at pH 8, the attachment matrix was more prevalent at 21 C than at 35 C and may also be related to the length of incubation time at 21 C. It appears that adherence may be related to the flagella and any exopolymer surrounding the cells. AS

BIOTECHNOLOGY

291 Defrise (D) and Gekas (V). Microfiltration membranes and the problem of microbial adhesion. A literature survey. **Process Biochemistry** 23(4); 1988; 105-116

The literature data from two separate areas microfiltration membranes and microbial adhesion for the study of the potential application of cross flow microfiltration in biotechnological down stream processing is covered. The review covers microfiltration membrane materials and criteria for their selection; mechanisms of microbial adhesion, surface properties of microorganisms and their methods of measurement; biofouling studies and CFMF studies in cell harvesting, cell debris removal and cell recycling in bioreactor applications. NGKR

292 Klinke (W). Economic and ideologic tasks of the further realization of the biotechnology. **Lebensmittelindustrie** 35(3); 1988; 97-99 (De).

293 Setzermann (U). Immobilized biocatalysts in the food industry. **Lebensmittelindustrie** 35(3); 1988; 103-106 (De).

The immobilization of microorganisms, enzymes, animal and plant cells to organic or inorganic carriers is a method to increase the productivity of biotechnological processes. The advantages of the application, the methods of immobilization and the carrier materials are described briefly. The article contains examples from bibliography on the application in the food industry. Problems of transferring of the lab. processes into the industrial practice are hinted at. AS

Single cell proteins

294 Giec (A) and Skupin (J). Single cell protein as food and feed. **Nahrung** 32(3); 1988; 219-229

This review discusses the current knowledge concerned with the application of SPC (single cell protein) in human and animal nutrition. Aspects covered include the utilization of microbial proteins in human nutrition, such as toxicological barriers, nutritive value and functional properties. Special attention is paid to several modern procedures of protein extraction from microbial cells, reduction of nucleic acids levels as well as preparation of protein isolates. 69 references. BV

295 Solomon (BO) and Layokun (SK). Studies on the potential of cashew apple for bioconversion to single cell protein. **Process Biochemistry** 23(4); 1988; 97-99

This paper reports the use of the cashew pomace for production of a high protein feed for swine, cattle and other animals by its ability to support the growth of **Saccharomyces cerevisiae**. The growth studies were carried out in a 7.5% batch fermenter at a pH of 5.0 and 30 C with and without nutrient supplementation. The protein enriched products with about 39.4% and 42.3% protein were obtained from unsupplemented and supplemented cashew apple pomace resp. The mass of protein in final product expressed as a percentage of the total mass of initial cashew apple was 1.7 and 2.44 for the unsupplemented and supplemented cashew pomace resp. as compared to the corresponding values of 1.3 and 2.3 obtained for the cashew juice. These results showed that the pomace was found to be a better medium than the ordinary juice but need was found to supplement the pomace in the production of the protein enriched product which finds use as feed in the tropics which grow plenty of cashew apple and where protein deficiency occurs. NGKR

TISSUE CULTURE

Nil

FOOD ADDITIVES

Colourants

296 Freund (PR), Washam (CJ) and Maggion (M). Natural colour for use in foods. **Cereal Foods World** 33(7); 1988; 553-554, 556, 558-55

In this feature article, the authors listed different natural colours approved for use in foods in the United States. The approved natural colours are annatto extract, beet powder, caramel, Beta-carotene, cochineal extract, grape skin extract, fruit juices, vegetables jucies, paprika, turmeric and turmeric oleoresin. The properties of natural colours and their limitation are also discussed. PHR

Emulsifiers

297 Kato (A), Murata (K) and Kobayashi (K). Preparation and characterization of ovalbumin-dextran conjugate having excellent emulsifying properties. **Journal of Agricultural and Food Chemistry** 36(3); 1988; 421-425

Soluble protein-carbohydrate conjugates have been prepared by coupling ovalbumin to cyanogen bromide activated dextran. The ovalbumin-dextran conjugate shows a broad distribution of mol. wt., from 250 to several thousand kilodaltons. The emulsifying properties of the ovalbumin-dextran conjugate were much higher than that of native ovalbumin and were superior to those of commercial emulsifier, especially in high salt concn. and in acidic pH. Conjugates of dextran with other proteins, such as lysozyme and soy protein, also showed excellent emulsifying properties. Thus, it was suggested that the protein-dextran conjugate can be used as a soluble macromolecule emulsifier for food industry. AS

Flavourings

298 Stofberg (J). Consumer exposure to chemically defined flavouring substances. **Perfumer & Flavorist** 13(1); 1988; 19-22

Stabilisers

Gum arabic

299 Anon. Gum arabic. Ready to use without problems. Confectionery Production 54(3); 1988; 176, 192

The purification of gum arabic is briefly described to get the product which is easily soluble in water and which can be added as powder to other raw materials. The purification procedures includes dissolution in water, filtering and centrifuging followed by drying at 130 C to get in the form of flakes. The application of this gum in confectionery products is listed. SYR

CEREALS

300 Graham (H) and Rydberg (MG). Extraction of soluble dietary fiber. **Journal of Agricultural and Food Chemistry 36(3); 1988; 494-497**

The influence of extraction conditions on the solubility of dietary fiber was examined in four cereals (wheat, rye, barley, oats) and four vegetables (potato, carrot, lettuce, pea). The extraction conditions examined were (a) pH 5.0 acetate buffer at 96 C for 1 h and 60 C for 4 h during starch degradation, (b) water at 38 C for 2 h, (c) pH 1.5 HCl/KCl buffer at 38 C for 2 h, and (d) pertreatment with absolute ethanol at 96 C for 1 h and extraction with water at 38 C for 2 h. Although extraction at high temp. gave in general the highest values for soluble fiber, and extraction in acidic buffer the lowest, the yield and composition of soluble fiber varied considerably with extraction conditions and food samples. The use of standardized and physiologically more appropriate extraction conditions is proposed. AS

Barley

301 Yin (XS) and McGregor (AW). An approach to the identification of a Beta-glucan solubilase from barley. **Journal of the Institute of Brewing 94(5); 1988; 327-330**

Beta-glucans play a very important role in malting and brewing of barley. A Beta-glucan solubilase (Beta-glucanase) present in barley solubilises the Beta-glucan to lower mol. wt. carbohydrates which is desired in brewing. The Beta-glucanase was isolated and purified by ion exchange chromatography on DEAE cellulose and gel permeation chromatography on Bio-gel P-100. The pH of maximal activity of the Beta-glucan solubilase was pH 5.7, and the enzyme had a low PI value and a mol. wt. between 5 x 10^4 and 6 x 10^4. The enzyme extracted from the whole barley kernel was rather heat labile and retained its 85% activity after 40 min at 62 C. NGM

Oat

Oat proteins

302 Ma (C-Y), Khanzada (G) and Harwalkar (VR). Thermal gelation of oat globulin. **Journal of Agricultural and Food Chemistry** 36(2); 1988; 275-280

Rice

303 Taira (H) and Itani (T). Lipid content and fatty acid composition of brown rice of cultivars of the United States. **Journal of Agricultural and Food Chemistry** 36(3); 1988; 460-462

The lipid content and fatty acid composition of brown rice of US cvs were investigated on a nonwaxy group of 14 long-, 10 medium-, and 2 short-grain types and a waxy group of 2 short-grain types. No significant difference among 3 nonwaxy grain types was observed in lipid content and fatty acid composition except arachidic and behenic acids between long-and medium-grain types. The significant difference between nonwaxy and waxy groups was shown in palmitic acid content. As for the relationship between fatty acid contents, there was the highest and negative correlation between oleic and linoleic acids in the nonwaxy group. The scatter diagram between both fatty acids could not be divided into grain types in nonwaxy groups but might be divided into nonwaxy and waxy groups. AS

Wheat

304 Dexter (JE), Martin (DG) and Matsuo (RR). The effect of roll flute orientation on durum wheat experimental milling performance and semolina quality. **Canadian Institute of Food Science and Technology Journal** 21(2); 1988; 187-193

An experimental durum wheat semolina mill flow was developed for the GRL Ross experimental mill to study the effects of changing roll flute orientation from dull to dull to sharp to sharp. Changing roll flute orientation did not influence the relative quality rankings of durum wheats, but mill stock distribution, semonlina quality, spaghetti colour and spaghetti cooking quality were significancly affected. Semolina ash increased markedly when roll flute orientation was changed to sharp to sharp, imparting poor spaghetti colour. Under experimental milling conditions the dull to dull roll flute orientation gives a better estimate of commercial semolina milling potential and spaghetti colour than the sharp to sharp roll flute orientation. AS

305 Gopal (S) and Sekhon (KS). Effect of karnal bunt disease on the milling, rheological and nutritional properties of wheat. Effect on the quality and rheological properties of wheat. **Journal of Food Science** 53(5); 1988; 1558-1559

306 Gopal (S), Sekhon (KS), Bajaj (KL), Saigal (RP) and Singh (H). Effect of karnal bunt disease on the milling, rheological and nutritional

properties of wheat. Studies on some chemical constituents and biological effects. Journal of Food Science 53(5); 1988; 1560-1562

The effect of karnal bunt disease at 1, 3, 5, and 10% level of diseased grain infection on trimethylamine content, phenolic acids was found to increase with progressive increase in disease infection. Aflatoxin was absent in both healthy and infected wheats. Rat feeding with different percentages of karnal bunt-infected diets showed no adverse effect on the feed acceptability. Rather, animals fed diets having 5 and 10% infected wheat showed higher feed intake. Diets having 10% infected wheat resulted in reduced liver wt., white blood cell, and monocyte counts. AS

307 Hook (SCW) and Salmon (SE). Gravity separation of low falling number wheats. Flour Milling and Baking Research Association Bulletin ; 1988; 184-195

308 McDonald (CE), Bruns (CJ) and D' Abbolonia (BL). Flour protein error and baking quality changes from treatment of wheat grain with corn pounds used nitrogen fertilizers. Cereal Foods World 33(7); 1988; 578-580

Since an error to the high side in wheat protein analysis can be caused by adulteration of the grain with N fertilizers, a study was initiated to determine how this would affect milling and baking. For this study, wheat samples were treated with ammonia or urea and then experimentally milled to flour. Flour extraction did not change due to the treatments. Flour from both the ammonia and urea treated wheats gave an error to the high side in protein results by both the Kjeldahl and near infrared (NIR) methods. Ammonia treatment caused abnormal farinograph curves with increased peak time and absorption and decreased mixing tolerance index (MTI). Urea treatment may have slightly decrased peak times, MTI, and absorption. In bread baking, ammonia treatment may have caused the grain and texture of bread to be "young" and the crust slightly pale, while urea treatment caused "young" grain and texture, and dark crust. McDonald and Bruns (1) reported a protein error to the high side by both Kjeldahl and NIR methods for wheat adulterated with four chemical compounds used commercially as N fertilizers. No information was available on how this adulteration might affect flour protein and the milling and baking quality of bread wheat. For this reason, the effects of the two widely used N fertilizers, ammonia and urea, were determined. AS

309 Pussayanawin (V), Wetzel (DL) and Fulcher (RG). Fluorescence detection and measurement of ferulic acid in wheat milling fractions by microscopy and HPLC. Journal of Agricultural and Food Chemistry 36(3); 1988; 515-520

Wheat bran

310 Bochowski (M), Vanderstoep (J) and Kitts (DD). Effect of heat treatment and organic acids on bioavailability of endogenous iron from wheat bran in rats. Canadian Institute of Food Science and Technology Journal 21(2); 1988; 161-166

The conversion of endogenous iron from wheat bran into hemoglobin was evaluated by a hemoglobin regeneration assay in weanling anemic rats. Iron repletion diets were formulated with both baked and unbaked wheat bran in the form of muffins and with ferrous sulphate as the reference standard. Hemoglobin iron regeneration efficiency for ferrous sulphate was 65.1%, whereas similar values for wheat bran in various experimental diets ranged from 46.1 to 66.5%. Baking of the muffins increased significantly (P less or equal to 0.05) the hemoglobin iron regeneration efficiency. The hemoglobin iron regeneration efficiency and apparent absorption were further enhanced by supplementing diets with orange juice or ascorbic acid. Citric acid showed no significant influence on hemoglobin iron regeneration efficiency. These results demonstrate a positive effect of baking and the presence of certain organic acids on the bioavailability of endogenous iron from wheat bran. AS

Wheat products

Chapathies

311 Sidhu (JS), Seibel (W), Brummer (J-M) and Zwingelberg (H). Effect of flour milling conditions on the quality of Indian unleavened flat bread (Chapathi). Journal of Food Science 53(5); 1988; 1563-1565

The effect of whole wheat flour granulation, bran size, damaged starch and protein contents on the quality of chapathi is reported. The cutting, puncture and stretching force values (taken on Zwick universal testing machine) on chapathies produced from finer whole wheat flour with higher damaged starch as well as higher water absorption, were lower, thus indicating their soft texture. The inclusion of coarse bran (15%) into 85% extraction flour, adversely affected the chapathi texture; however a similar addition of fine bran showed no deterimental effect. AS

Wheat proteins

312 Mason (MJ) and Maris (PI). NIROS. On-line measurement of wheat protein content. Flour Milling and Baking Research Association Bulletin ; 1988; 196-202

The development and subsequent assessment of suitable NIROS-based equipment for the on-line measurement of wheat proteins, have been described. MVG

Gluten

313 Kos (S), Jaczkowski (J) and Pior (H). Turbidity test using sodium salts of lyotropic series for measurement of gluten protein hydrophobicity. Nahrung 32(3); 1988; 275-280

Using two winter wheats of high and medium quality, Cheyenne and Zeta of different maturation stages, and three selected salt types of lyotropic series, the turbidity of gluten solutions was investigated.

It was treated as the measure of hydrophobic interactions of protein mol. and their aggregation potentiality, which are of significance in the formation of gluten baking quality. As could be seen from the results obtained, the large turbidity changes observed in salts of various concn. indicate that in building up gluten complexes the hydrophobic interactions may play a significant role. This significance seems to be higher in wheats of higher quality and increases during the grain development. The highest increase of hydrophobicity takes place in the earlier stages of grain formation, until its 50% dry matter has been reached. AS

MILLETS

Corn

314 Arriola (Mdel C), de Porres (E), Cabrera (S), Zepeda (M) and Rolz (C). Aflatoxin fate during alkaline cooking of corn for tortilla preparation. **Journal of Agricultural and Food Chemistry** 36(3); 1988; 530-533

Corn Nutricta var. was inoculated with **Aspergillus parasiticus** NRRL 2999 and aflatoxin production at 35 C was determined as a function of time. The contaminated corn was employed to prepare tortillas by the alkaline cooking process called nixtamalization. Aflatoxin reduction was checked as a function of initial levels, cooking temp. and amount of calcium hydroxide. Starting with initial values between 1360 and 1896 μ g/kg and employing the amounts of calcium hydroxide required to produce a good tortilla, although there was an aflatoxin decrease, none of the treatments was capable of reaching the allowable threshold values of 20 μ g/kg. When 2-10% CaO was used to prepare the dough, an intense yellow colour developed and the tortillas lost their normal organoleptic characteristics. In all cases studied, even at the lowest CaO concn., a higher decrease of total aflatoxin was found from corn to dough preparation during nixtamalization. During alkaline cooking aflatoxins G1 and G2 were more susceptible to degradation than B1 and B2. B1 was more resistant than B2. AS

315 Bruechert (LJ), Zhang (Y), Huang (T-C), Hartman (TG), Rosen (RT) and Ho (C-T). Contribution of lipids to volatiles generation in extruded corn based model systems. **Journal of Food Science** 53(5); 1988; 1444-1447

316 Cuero (R), Smith (JE) and Lacey (T). Mycotoxin formation by **Aspergillus flavus** and **Fusarium graminearum** in irradiated maize grains in the presence of other fungi. **Journal of Food Protection** 51(6); 1988; 452-456

Production of aflatoxins B_1 and G_1 by **Aspergillus flavus** and zearalenone by **Fusarium graminearum** were studied when they were cultured singly and in pairs with other filamentous fungi in irradiation sterilized maize seeds, at 0.98 , 0.95 and 0.90 water activity incubated at 16 and 25 C. **A. flavus** was paired with **A. niger**, **A. oryzae**,

Penicillium viridicatum, and **F. graminearum** was paired with only **A. flavus**. Aflatoxin production was more in pure cultures than in mixed cultures at higher water activities, and production was enhanced at 0.90 water activity 25 C incubation favoured more aflatoxin production compared to 16 C. Presence of **A. flavus** affected the production of zearalenone more at 16 C incubation than at 25 C. Effect of temp. (25 and 16 C) or water activities (0.90, 0.95, 0.98) had very little effect on zearalenone production. CTD

Corn starch

317 Inlow (D), McRae (J) and Ben-Bassat (A). Fermentation of corn starch to ethanol with genetically engineered yeast. **Biotechnology and Bioengineering** 32(2); 1988; 227-234

The yeast **Saccharomyces cerevisiae** is commonly used in the brewing industry and in the commercial fermentation of carbohydrates to ethanol. **Sacch. cervisiae** strains lack significant amylase and glucoamylase activities and are unable to ferment starch. This study reports the evaluation of the performance of glucoamylase - producing recombinant yeast strains for direct fermentation of soluble starch to ethanol and analyses the rate limiting step in this combined process. Approx. 95% of the carbohydrates in the starch were utilized. Glycerol production was significantly decreased when soluble starch was used instead of glucose. Ethanol yield on soluble starch was higher than that on glucose. The rate of starch fermentation was directly related to glucoamylase activity. The synthesis and secretion of glucoamylase showed no deleterious effects on cell growth rates, fermentation rates, and fermentation products. GAR

Pearl millet

Pearl millet flour

318 Mahajan (S) and Chauhan (BM). Effect of natural fermentation on the extractability of minerals from pearl millet flour. **Journal of Food Science** 53(5); 1988; 1576-1577

Natural fermentation of pearl millet flour was carried out at 20, 30, 40 and 50 C for 24, 48, 72 and 96 h. The fermentation improved the HCl-extractability of minerals including calcium, Zn, Fe, Mn, and Cu in pearl millet flour. The highest extractability of minerals was observed at 96 h at all the temp. AS

Sorghum

319 Chavan (UD), Chavan (JK) and Kadam (SS). Effect of fermentation on soluble proteins and in vitro protein digestibility of sorghum, green gram and sorghum-green gram blends. **Journal of Food Science** 53(5); 1988; 1574-1575

Changes in pH, titratable acidity and proteins of meals of sorghum, green gram and sorghum-green gram blend (70:30, W/W) during fermentation at 25 C up to 5 days were monitored. The pH of fermenting meals decreased sharply with concomitant increase in the titratable acidity within 24 h. The proteins, free amino acids, soluble proteins and in vitro protein digestibility markedly increased within 24 h fermentation. Supplementation of green gram with sorghum decreased the acidity and improved the contents of crude protein, soluble proteins and free amino acids of fermented sorghum meal. AS

PULSES

Adzuki beans

320 Tjahjadi (C), Lin (S) and Breene (WM). Isolation and characterization of adzuki bean (**Vigna angularis cv Takara**) proteins. **Journal of Food Science** 53(5); 1988; 1438-1443

Protein extract (P-1), isolate (P-II), albumin (PA), and globulin (PG) were isolated from Minnesota-grown adzuki beans. Total extractable protein and water- and salt- soluble fractions accounted for 21.6, 15.8, and 2.3% (d.b.), resp. Fractions were compared with a commercial soy protein (PS) for chemical and functional properties. Proteins in P-I, PA, PG, P-II, and PS were 78.8, 69.4, 89.2, 91.3 and 89.9% (d.b.), resp. P-I, PA, and PG were superior to PS in essential amino acid contents; P-II was comparable to it. Adzuki bean proteins, except for PA, showed high solubility at acidic and alkaline pH. Compared to PS, the adzuki bean protein fractions (except P-II) showed greater fat absorption and water adsorption, greater foaming (except PG), and lower emulsifying capacities (except P-II) and stabilities. P-I and PA showed lower, and P-II higher, least gelation concn. than PS. AS

Cowpeas

321 Hung (Y-C), McWatters (KH) and Chinnan (MS). A microscopic method to quantify whippability. **Journal of Food Science** 53(5); 1988; 1566-1569

A microscopic method based on stereologic principles was developed to quantify the amount of air in a gas-in-liquid dispersion. Whipped pastes made from cowpeas dried at 50, 70, 90 or 110. C were used as the test system. The method effectively demonstrated qualitative and quantitative differences in the samples and correlated well with sp. gr. and total foam vol. measurements; the correlation coeff. were -0.98 and 0.94, resp. AS

Faba beans

322 Villanueva (MR), Martinez (JA) and Larralde (J). Role of polyphenols in the low nutritive value of **Vicia faba**. **Archivos Latinoamericanos de** Nutricion 37(2); 1987; 324-332

The inclusion of field bean (**Vicia faba**) in diets for growing experimental animals, reduced their growth performance in a similar way as compared with controls fed a casein diet, with 0.2% tannic acid. Hydroalcoholic extracts or isolated tannins obtained from **Vicia faba** seeds, decreased the intestinal transport of D-glucose. The addition of 0.05, 0.1 or 0.2% of tannic acid to the perfusion solutions containing D-glucose proportionally diminished the intestinal uptake of sugar according to its polyphenolic content. It has been postulated that polyphenols reduce, at least partially, the nutritive value of legumes, by altering monosaccharide absorption. Other constituents, however, could also be involved. AS

Lentils

323 Bhatty (RS). Composition and quality of lentil(**Lens culinaris** Medik). A review. **Canadian Institute of Food Science and Technology Journal** 21(2); 1988; 144-160

Pertinent literature on the chemical composition and quality of the cultivated lentil is reviewed with the objective of consolidating the available information for easy reference by lentil researchers. MVG

Peas

324 Sanford (KA), Gulllett (EA) and Roth (VJ). Optimization of the sensory properties of frozen peas by principal components analysis and multiple regression. **Canadian Institute of Food Science and Technology Journal** 21(2); 1988; 174-181

A comprehensive description of frozen peas processed was developed and these descriptors were examined for their ability to discriminant between samples and yet not give redundant information. The relationship between the descriptive data and consumer acceptance data was also explored in order to obtain information on the optimization of the sensory properties of peas. MVG

OILSEEDS AND NUTS

Cottonseeds

325 Hamza (MA), Abdel-Aal (MH) and Khalil (MM). Studies of Egyptian cottonseeds. Fatty acid composition and protein patterns. **Nahrung** 32(3); 1988; 255-259

Fourteen Egyptian cottonseed var. were analysed to study some properties of their lipids and proteins. Lipid contents of the kernels ranged from 29.0 to 35.1%. The mean value of the iodine number was 110.9. The tested var. showed little or no differences regarding their fatty acid content. A slight higher proportion of linoleic acid was recorded for the triglycerides whereas the polar lipid components contained a lower amount of this fatty acids compared to that found in the total lipid. Protein contents in the examined var. ranged from 32.3 to 37.9%. The amount of water-soluble protein ranged from 12.8 to 23.0% of the total protein. An almost complete recovery (94.5-

100%) of the total protein was yielded when the extraction was performed with 0.02 N sodium hydroxide instead of water. The electrophoretic patterns of the water-soluble proteins gave only two bands, having a mol. wt. between 14000 and 25000 dalton. A clear differentiation between the var. was noticed. When then alkaline soluble protein extracts were subjected to electrophoresis. Accordingly, the examined var. were classified into five groups each of them having a similar spectrum. AS

Cottonseed proteins

326 Mohan Reddy (I) and Narasinga Rao (MS). Interaction of gossypol with gossypin (11S protein) and congossypin (7S protein) of cottonseed and glycinin (11S protein) of soybean. 1. Reaction kinetics, binding stoichiometry, and reversibility studies. **Journal of Agricultural and Food Chemistry** 36(2); 1988; 245-252

Interaction of gossypol with gossypin, congossypin, and glycinin at pH 9.0, 8.0 and 7.6 resp., followed by a difference spectral method, indicated that the gossypol-protein complexes were characterized by difference absorption maxima at 430-432 nm (gossypin), 436-437 nm (congossypin), and 430 nm (glycinin). The reaction was time dependent and was complete by 2h with gossypin, 3h with congossypin, and 10 h with glycinin. The number of binding sites in protein (n) was 4.0 for both gossypin and congossypin and 5.0 for glycinin. Thus, gossypin and congossypin bind a max. of 4 gossypol molecules/mol of protein, while glycinin binds 5. Interaction was completely reversible, suggesting that only nonconvalent interactions were involved. The low association constants (K) suggested that the binding was of weak type and involved nonconvalent interactions. AS

327 Mohan Reddy (I) and Narasinga Rao (MS). Method for the isolation of gossypin (11S protein) and congossypin (7S protein) from glanded cottonseed. **Journal of Agricultural and Food Chemistry** 36(2); 1988; 237-240

A method for the isolation of gossypin and congossypin from glanded cottonseed has been developed on the basis of their solubility characteristics as a function of ionic strength and temp. Further purification of the proteins by gel filtration on Sephadex G-200 column yielded homogeneous (-98%) preparations, as judged by sedimentation velocity, gel electrophoresis, and ion-exchange chromatography. Gossypin and congossypin were characterized by sedimentation constants ($S_{20,w}$) of 11.0 and 7.6 and $E^{1\%}_{1cm}$ at 280 nm of 7.6 and 6.0 resp. The proteins were free from gossypol (free and bound) and nucleic acid impurities. AS

328 Mohan Reddy (I) and Narasinga Rao (MS). Physicochemical properties of gossypin (11S protein) and congossypin (7S protein) of glanded cottonseed. **Journal of Agricultural and Food Chemistry** 36(2); 1988; 241-245

Gossypin and congossypin, major storage proteins of cottonseed, are characterized by sedimentation constants ($S_{20,w}$) of 11.0 and 7.6

mol. wt. of 240 000 and 143 000, E / at 280 nm of 7.6 and 6.0, and UV absorption maxima of 279 and 277 nm, resp. Both proteins have a fluorescence emission max. at 325 nm. They have a globular shape, an oligomeric structure with subunits, and a secondary structure consisting mostly of Beta-pleated and periodic structures. The proteins are rich in glutamic acid, arginine, and aspartic acid and relatively low in sulphur amino acids. AS

Groundnuts

Groundnut milk

329 Hao (Y-Y) and Brackett (RE). Removal of aflatoxin, B from peanut milk inoculated with **Flavobacterium aurantiacum**. **Journal of Food Science** 53(5); 1988; 1384-1386

The stability of **F. aurantiacum** to reduce the aflatoxin B_1 (AFB) concn was determined by inoculating about 10 stationary phase cells in AFB_1 contaminated phosphate buffer (PB), non-defatted peanut milk (DPM) and partially defatted peanut milk (PDPM). The AFB concn. and cell populations were determined periodically throughout the incubation (30 C). After 24 h the concn. of AFB_1 decreased about 40% in PB, 23% in NDPM and 74% in PDPM. Viable cell population decreased less than one $\log_{10}$ CFU/mL in all liquids but increased about 0.8 $\log_{10}$ unit in control PDPM. AFB_1 recovery increased about 30% in proteolysed PDPM but proteolysis had no effect on recovery from NDPM. AS

Pistachio nuts

330 Shokraii (EH) and Esen (A). Composition solubility, and electrophoretic patterns of proteins isolated from kerman pistachio nuts (Pistaciavera L.). Journal of Agricultural and Food Chemistry 36(3); 1988; 425-429

Extraction of protein from two pistachio sources (Kerman and Turkish) was performed with different solvents. The results showed the max. amount of protein extracted with 0.5 M NaCl solution. The other solvents is sequential extraction, e.g. water, 60% (v/v) tert-butyl alcohol, and 0.1 M sodium borate (pH 10)/1% (w/v) sodium dodecyl sulphate/ 1% (v/v) 2-mercaptoethanol (2-ME), extracted little or no protein. The Kjeldahl data indicated that 66% of the total protein was globulin (NaCl soluble) while albumins (water soluble), glutelins (sodium borate soluble), and prolamins (tert-butyl alcohol soluble), resp., contributed 25, 7 and 2% of the total protein. Fractionation of the protein by sodium dodecyl sulphate-polyacrylamide gel electrophoresis (SDS-PAGE) and isoelectric focusing (IEF) showed three of the four solubility fractions had complex polypeptide compositions with mol. wt. of 12-68 K. However the protein profiles of all fractions were very similar except for the alcohol extract which did not produce any distinct bands. Two-dimensional electrophoretic analyses revealed about 100 protein spots when the meal was extracted directly with 6 M urea and 1% 2-ME, and the two pistachio sources showed similar polypeptide patterns. AS

Rapeseeds

Rapeseed proteins

331 Tzeng (Y-M), Diosady (LL) and Rubin (LJ). Preparation of rapeseed protein isolate by sodium hexametaphosphate extraction, ultrafiltration, diafiltration, and ion-exchange. **Journal of Food Science 53(5); 1988; 1537-1541**

A novel processing scheme for the production of rapeseed protein isolate was developed which includes extraction using aqueous sodium hexametaphosphate solution followed by activated-carbon treatment, ultrafiltration, diafiltration, and purification by ion-exchange. Aqueous sodium hexametaphosphate is an effective extraction agent for rapeseed proteins. The activated-carbon treatment removes glucosinolate hydrolysis products and colour compounds. The membrane treatments reduce the concn. of soluble low-mol. wt. components to low levels. An anion exchange resin was used in the last step to remove phytate and residual hexametaphosphate. The process resulted in a protein isolate containing about 90% protein. Sixty-three per cent of the nitrogen in the meal was recovered as an isolate free of glucosinolates, low in phytates and fiber, light in colour, and bland in taste. AS

Sesame

332 Fukuda (Y) and Namiki (M). Recent studies on sesame seed and oil. **Journal of Japanese Society of Food Science and Technology '(Nippon Shokuhin Kogyo Gakkaishi') 35(8); 1988; 552-562 (Ja).**

A review article containing 50 reference in Japanese language **BHSR**

333 Rajendran (S) and Prakash (V). Isolation and characterisation of Beta-globulin low molecular weight protein fraction from sesame seed (Sesamum indicum. L). **Journal of Agricultural and Food Chemistry 36(2); 1988; 269-275**

The low mol. wt. protein fraction from the proteins of sesame seed has been isolated in a homogeneous form and is termed Beta-globulin or consesamin. The protein has an $S_{o20\omega}$ / of 2.0 plus or minus 0.1, $D_{20,\omega}$ / of 8 x 10^{-7}/cm^{2}/S, and a partial specific vol. of 0.725 mL/g. The intrinsic viscosity of the protein was determined to be 4.1 mL/g. The mol. wt. determined by various approaches gives a value of 15000 plus or minus 500. The evaluation of frictional ratios using Stokes radius and other hydrodynamic parameters indicates that the protein is elongated. The secondary structure of the protein indicates it to be rich in a alpha helix. The protein is rich in acidic amino acids, especially glutamic acid, and also hydrophobic amino acids. AS

334 Han (YM) and Wilfred (AG). Phytate hydrolysis in soybean and cottonseed meals by **Aspergillus ficuum phytase. Journal of Agricultural and Food Chemistry** 36(2); 1988; 259-262

335 Mason (AC), Browe (PJ) and Weaver (CM). Metabolism of selenium from soybean and egg products in rats. Journal of Agricultural and Food Chemistry 36(2); 1988; 256-259

The utilization of selenium (Se) from soy flour and eggs was evaluated by comparing whole-body absorption, retention, and tissue accumulation of ^{75}Se in rats from radiolabeled test meals. Selenium depleted male Sprague-Dawley rats were fed selenium-adequate repletion diets containing either egg, soy, combined egg/soy, or sodium selenite supplemented torula yeast as the protein sources. The first meal of the repletion period was radiolabeled. Intrinsically labelled egg protein was obtained by gavaging hens with (^{75}Se) selenomethionine or sodium (^{75}Se) selenite. Soy was intrinsically labeled via nutrient culture with sodium (^{75}Se) selenite (sodium selenite) or sodium (^{75}Se) selenate (sodium selenate). The combined egg/soy diet contained egg from hens gavaged with sodium selenite and soy grown with sodium selenite. Torula yeast was extrinsically labeled by adding sodium selenite. A significantly greater amount of ^{75}Se was absorbed and retained from egg than from soy protein. The ^{75}Se from mixed egg/soy protein diets was absorbed and retained at a level intermediate to that of the egg or soy protein diets alone, suggesting the formation of a common pool of selenium within the intestinal tract. AS

336 Tanahashi (K), Takano (K), Matsumoto (S), Kamoi (I) and Obara (T). Effects of soybean protein on thermal stability of soybean trypsin inhibitor. Studies on soybean trypsin inhibitor. Part II. Journal of Japanese Society of Food Science and Technology '(Nippon Shokuhin Kogyo Gakkaishi') 35(8); 1988; 534-540 (Ja).

In this paper, effects of soybean protein on thermal stability of trypsin inhibitor(TI) was investigated. Changes of thermal stability of TI by adding soybean protein components, such as 7S, 11S and 15S, were examined first of all. As a result, TI heated with 11S indicated the remarkable reduction of anti-tryptic activity and thermal stability 11S has 2 mol. of SH group in its mol. but 7S and 15S hardly have. Accordingly, effect of the SH group on thermal stability of TI were investigated by addition of some amino acids. As a results, only addition of cysteine showed the same effect as the addition of 11S. When 11S and cysteine were added to TI after modification of the SH with P-chloromercuribenzoate (PCMB), and heated, remarkable inactivation of TI was not observed. When TI was heated with PCMB, the absorbancy at 250 nm (mercaptide) increased remarkably. This indicates the reduction of SS bonds in TI mol., and also suggests that the heat inactivation of TI was due to the exchange reduction of the SH and SS between 11S and TI. For above reasons, effects of 11S on thermal stability of TI fractions obtained from chinese soybean were compared. TI activities were declined 30-60% with 11S against the remaining activities without 11S. AS

337 Tanahashi (K), Takano (K), Matsumoto (S), Kamoi (I) and Obara (T). Effects of heat treatment on the affinity of soybean trypsin inhibitor for trypsin. Studies on soybean trypsin inhibitor. Part III. Journal of Japanese Society of Food Science and Technology '(Nippon Shokuhin Kogyo Gakkaishi') 35(8); 1988; 541-544 (Ja).

In our study, trypsin inhibitor (TI) was inactivated remarkably by heating with soybean 11S protein (11S). Then, denaturation of TI by heating was investigated as a change of the affinity of TI for trypsin. That is, the value of TI activity which made half the affinity of trypsin for the substrate was obtained by the plot of Lineweaver Burk (defined as Kt), and the Kt of each TI was compared. The Kt of each TI obtained by DEAE-cellulose was about 15-100 unit, and these values changed little after heating at 100 C for 15 min. However, when TI was heated with 11S, the value of Kt increased 1.5-5 times and the affinity of TI for trypsin declined remarkably. Since it was presumed that the Kt of TI in soybean products changed because TI in soybean products received heat treatment with 11S during processing, the Kt of TI in soybean products was measured, and the TI was investigated. As a results, the Kt of TI in Tonyu was 30 units but that of TI in the other soybean products was unmeasurable, because no effects of TI on Km value was seen when TI was added up to 500 units. Following this, TI in soybean products was added to the reaction mixture of trypsin and a substrate to investigate the ability of TI to compete with the substrate for trypsin. As a result, the reaction between trypsin and the substrate immediately stopped by adding TI in Tonyu, but the other soybean products showed no effects for this reaction. The above results indicate that TI in almost all soybean products, while having remaining the anti-tryptic activity, remarkably reduced its affinity for trypsin by heating with 11S and practically had no effect on trypsin activity. AS

Soy products

Soy sauces

338 Ching (CY), Leng (FW) and Pheng (KY). Composition and microbiological quality of Chinese or Tamari soy souce. **ASEAN Food Journal** 3(2); 1987; 79-80

In this paper the composition, microbiological quality of tamari type soy sauce produced in Singapore and Malaysia have been discussed and compared with national standards for soy a sauce of Singapore, Malaysia, Thailand, Phillippines and Tamari sauce of Japan. These were analysed for pH, sp. gr. salt, total solids-less-salt, total nitrogen, Amino-nitrogen and halophilic yeast count per ml. It was seen that most of the samples complied with the National Standards prescribed for these parameters by the ASEAN countries. NGKR

Soy proteins

339 Damodaran (S). Refolding the thermally unfolded soy proteins during the cooling regime of the gelation process. Effect on gelation. **Journal of Agricultural and Food Chemistry** 36(2); 1988; 262-269

The thermal denaturation and gelation of soy proteins were studied. Evidence suggests that soy 11S globulin undergoes partial refolding during the cooling regime of the thermal gelation process. At 8% protein concn., in the absence of any additive, soy 11S refolded considerably during the cooling regime and failed to form gel. However, addition of 0.5 M NaClo4 inhibited the extent of refolding and caused gelation of 11S even at 8% concn., whereas addition of 0.5M NaClo promoted refolding and prevented gelation. On the basis of these findings a general mechanism for thermal gelation of globular proteins is proposed. It is possible to improve the gelation of globular proteins even at suboptimum protein concn. The thermal denaturation of soy proteins under various solution conditions is also discussed. AS

340 Kumosinski (TF). Use of thermodynamic linkage to study the salt-induced solubility change of soybean isolate. Journal of Agricultural and Food Chemistry 36(3); 1988; 669-672

Salt-induced solubility profiles of native and heat-denatured soy isolate reportedly were uninterpretable by the theory of Melander and Horvath. An explanation had been sought by a qualitative extension of the latter theory, discounting the notion that salt binding to various charged protein sites causes salting-out and subsequent salting-in. Reevaluation of the data, using nonlinear regression analysis with Wyman's theory of thermodynamic linkage, demonstrated that protein solubilities can now be linked to the free energy of salt binding. All profiles could then be described quantitatively by binding constants and solubilities K_1 and S_1 resp., for salting-out; K_2 and S_2 for slating in. K_1 was always exceeded K_2, but K_1, K_2 and S_1 followed no apparent trend with type of salt. However, K_1 was significantly larger for denatured than for native soy; S_2 correlated with the lyotropic series, strongly for the denatured, less so for the native isolate. AS

341 Thompson (DB) and Erdman (JWJr). Effect of various soy protein products on retention of nonheme iron from a casein test meal or from soy-based test meals. Journal of Food Science 53(5); 1988; 1460-1463, 1469

The influence of soy product processing on whole-body Fe retention by the rat was examined. Some, but not all, soy protein products present in the diet previous to a casein-based radiolabeled test meal lowered iron retention relative to that by rats fed the casein diet. A soy fiber preparation in the diet did not adversely affect ^{59}Fe retention. When various radiolabeled test meals were fed in either acid or neutralized form, neutralization of soy protein isolate (SPI), but not of casein, led to less ^{59}Fe retention ($P < 0.01$) from the test meal. After appropriate heat treatment, Fe retention from acid and neutralized SPI was not distinguishable, AS

342 Wesley Burks (AJr), Butler (HL), Brooks (JR), Hardin (J) and Connaughton (C). Identification and comparison of differences in antigens in two commercially available soybean protein isolates. Journal of Food Science 53(5); 1988; 1456-1459

Two commercially available soybean protein isolates were compared with regard to their allergenicity and their subcomponent differences. Isolate (A) is used in commercially prepared liquid infant formulas and isolate (B) in powdered infant formulas. Sera from four children with soy protein hypersensitivity and from five infants with soy protein-induced entercolitis were used for in vitro testing. ELISA results show that specific IgE and IgG antibodies to isolate (A) were significantly higher than to isolate (B) in all groups. In SDS polyacrylamide gel electrophoresis, isolate (A) has bands representing the subunits of 7S (B-conglycinin) and the acidic and basic subunits of 11S; isolate (B) had only much smaller mol. wt. compounds. Thus, there may be a difference in the allergenicity of liquid and powdered infant formulas. AS

343 Yasumoto (K), Suzuki (T) and Yoshida (M). Identification of selenomethionine in soybean protein. Journal of Agricultural and Food Chemistry 36(3); 1988; 463-467

The chemical form of selenium contained in soybean protein with a normal range of selenium levels was determined by proteolytic enzyme digestion, gel permeation column chromatography, thin-layer chromatography, and gas chromatography-mass spectrometry (GC-MS). Pepsin digestion of soybean protein isolate paralleled the liberation of dialyzable selenium. Actinase E digestion of pepsin and pancreatin-digested soybean gave rise to selenium-containing substances located on thin-layer chromatography at the same position as selenomethionine. Analytical data obtained by GC-MS confirmed an occurrence of selenomethionine in the digest as a constituent in the soybean protein. AS

Sunflower seeds

344 Theertha Prasad (D). Studies on the interaction of sunflower albumins with chlorogenic acid. Journal of Agricultural and Food Chemistry 36(3); 1988; 450-452

Acidic butanol extraction removed 90% of the phenolics from sunflower meal. The phenol-free meal contained a higher albumin level than the defatted meal. Gel permeation chromatography showed four and two protein peaks for defatted and phenol-free albumins, resp. Considerable variation in the electrophoretic mobilities in these two albumin preparations was observed. Amino acid analyses indicated low levels of phenylalanine, tyrosine, leucine, and valine in phenol-free albumin as compared to defatted albumin. Chlorogenic acid and phenol-free albumin interaction studies indicated aggregation of low mol. wt. albumins in sunflower. AS

TUBERS AND VEGETABLES

Root vegetables

Beet

345 Bayindirli (A), Yildiz (F) and Ozilgen (M). Modeling of sequential batch ultrafiltration of red beet extract. Journal of Food Science 53(5); 1988; 1414-1422

Sequential batch ultrafiltration of red beet extract was studied by employing membranes of decreasing mol. wt. cut-off in sequence. A mathematical model was developed after considering the series of resistances of the polarized layer and the membrane, but not polymer solution interaction. Experimental data indicated that Spery's type of expression which has been used to describe wine filtration was also valid for ultrafiltration. The data also revealed that in a special case of operation, when polarized layer resistance is considerably smaller than that of the membrane, the model reduces to a Dancy's law type of expression which is widely used in ultrafiltration. AS

Carrots

346 Plat (D), Ben-Shalom (N), Levi (A), Reid (D) and Goldschmidt (EE). Degradation of pectic substances in carrots by heat treatment. **Journal of Agricultural and Food Chemistry** 36(2); 1988; 362-365

Changes in the pectic substances of carrots were studied after heat treatment. Differences in soluble pectin and calcium pectate were observed after ion-exchange chromatographic separation on DEAE (diethylaminoethyl) cellulose. Different "fingerprints" were found in both pectic fractions after heat treatment. The ratio of neutral sugars to uronic acids was almost unchanged in the soluble pectin fraction, but the relative amounts of glucose and rhamnose increased after heat treatment by about 10- and 3-fold, resp. The ratio of neutral sugars to uronic acids in the calcium pectate increased after heat treatment from 0.11 to 0.27. On the average, all the neutral sugars increased about 3-fold while rhamnose increased about 8-fold. The increase in the relative amount of the rhamnose compared with other sugars in the heated tissue indicates possible degradation of pectins in the "hairy region". AS

Tubers

Potatoes

347 Jackman (RL) and Yada (RY). Functional properties of whey-potato protein composite blends in a model system. **Journal of Food Science** 53(5); 1988; 1427-1432, 1451

Potato protein from cv. Simcoe was combined with protein from acid whey in various proportions. Several functional properties of composites were determined over the pH range 4 to 8 pH, the proportion of potato protein, and their interaction significantly ($P < 0.001$) affected protein functionality. Addition of potato protein to whey significantly ($P < 0.05$) reduced solubility of composites at pH 4 and 5 and thermal stability at each pH. Max. thermocoagulation of proteins increased eightfold in magnitude and shifted from pH 4 to 6 with increasing potato protein. Emulsification and foaming properties generally improved as pH increased and the proportion of potato protein decreased. Protein solubility was significantly ($P < 0.001$) correlated with other functional properties. AS

348 McComber (DR), Osman (EM) and Lohnes (RA). Factors related to potato mealiness. Journal of Food Science 53(5); 1988; 1423-1425

Four potato cvs from 1984 and 1985 growing seasons were studied. Specific gravity did not correlate with potato size or shear strength, nor could it be used to predict sensory mealiness scores. Shear strength measures of then cooked potatoes showed that the Russet Burbank had a particularly strong structure at low deformation. Starches from the two more mealy cvs, Russet Burbank and Norchip, had slightly lower gelatinization temp. then those from the two waxy cvs, Pontiac and LaSoda. Gelatinization temp. were higher in potato juices than in water. Starches from the two mealy cvs gave swelling powers between those of the two waxy cvs, but yielded higher solubles. Pontiac potato starch exhibited anomalous behaviour in its resistance to swelling and in development of viscosity in the amylograph. AS

Sweet potatoes

349 Purcell (AE) and Walter (WMJr). Comparison of carbohydrate components in sweet potatoes baked by convection heating and microwave heating. **Journal of Agricultural and Food Chemistry** 36(2); 1988; 360-362

The carbohydrate fractions of sweet potatoes baked in a convection oven and in a microwave oven were compared. Samples baked in the microwave contained less total alcohol-soluble carbohydrates, reducing sugars, and dextrins and more starch than those cooked in the convection oven. Measurement of static stress of the samples suggested that samples cooked in the microwave oven would have a drier mouthfeel. As storage time increased, samples baked in the microwave oven became more dry, while those baked in the convection oven became more moist. AS

Vegetables

350 Kunzek (H) and Mrozek (S). Comparing examinations about the determination of the dry matter of dried vegetables and vegetable powder. **Lebensmittelindustrie** 35(3); 1988; 115-116

During comparing examinations of the percentage of solids in dried vegetables and vegetable powders, the methods were tested that apply the oven drying, the absolute moisture-content tester, the azeotropic distillation, the vacuum drying and the drying pistol. The methods were proved with respect to the analytical indices of accuracy and precision above all. The systematic errors being found in this connection depend on the analytical method used as well as on the manner of the tested dry product. AS

351 Mejuto-Marti (M), Bollain-Rodriguez (M), Herrero-Latorre (C) and Bermejo-Martinez (F). Selenium content of vegetables, fruits, and cereals in Galicia (Northwest Spain). **Journal of Agricultural and Food Chemistry** 36(2); 1988; 293-295

The selenium content of 60 samples of vegetables foods has been determined fluorimetrically. After wet destruction of organic matter, the complex 4, 5-benzopiazselenole was formed by reaction between, Se (IV) and 2, 3 diaminonaphthalene and extracted with cyclohexane. The results suggest that the population of Galicia (NW Spain) consumes an average 11.20 µ g of selenium/person per day in food of vegetable origin. AS

Leafy vegetables

352 Gupta (K) and Wagle (DN). Nutritional and antinutritional factors of green leafy vegetables. Journal of Agricultural and Food Chemistry 36(3); 1988; 472-474

On a moisture-free basis, mustard had the max. crude protein(CP 29.82%), while spinach had the min. CP (21.59%). Lipid content varied from 1.17 (Spinach) to 3.73% (cauliflower). Crude fiber and total minerals varied from 7.20 to 13.95% and 12.54 to 26.16% resp. Chickpea had the highest amount of iron, copper, manganese, and calcium. Mustard had the max, amount of phosphorus (1210.0 mg%) while spinach had the min. amount (740.0 mg%). The max. amounts of nitrate (5.35556%), saponin(2.45%), and oxalate (8.69%) were noted in spinach. No tryptic activity was detected in chickpea. A wide variation in amino acid profile was observed among green leafy vegetables. Green vegetables are good sources of minerals. AS

Amaranthus

353 Koeppe (SJ) and Rupnow (JH). Purification and characterization of lectin from the seeds of amaranth (**Amaranthus cruentus**). Journal of Food Science 53(5); 1988; 1412-1417, 1422

A lectin (ACL) was purified from the seeds of **Amaranthus cruentus** using affinity chromatography on fetuin-agarose. Apparent homogeneity of the lectin was demonstrated by SDS-PAGE, chromatography on Sephadex G100 and immunoprecipitation. The lectin was a dimer with an estimated mol wt. of 66,000 and subunit mol. wt. of 35,000. ACL-mediated agglutination was inhibited by D-GalNAc and fetuin. Thirty other carbohydrates were non-inhibitory. ACL contained 2.2% neutral carbohydrate and relatively high levels of aspartic acid, glutamic acid, serine and glycine. The purified lectin was relatively heat labile retaining approx. 10% of its original activity (titer) after 5 min at 70 C and after just 1 min at 100 C. AS

354 Morales (E), Lembcke (J) and Graham (GG). Nutritional value for young children of grain amaranth and maize-amaranth mixtures. Effect of processing. Journal of Nutrition 118(1); 1988; 78-85

Asparagus

355 Ganthavorn (C) and Powers (JR). Changes in peroxidase activity, hexanal, ascorbic acid and free sulphydryl in blanched asparagus during frozen storage. Journal of Food Science 53(5); 1988; 1403-1405

Asparagus spears were water blanched at 88 C for 1 to 4.5 min and stored at -18 C. Hexanal, ascorbic acid, free sulphydryl and peroxidase activity were monitored during storage. Blanching for 2 min resulted in a 98% reduction in peroxidase activity. No hexanal was detectable in product blanched for 2 min or longer. Ascorbate stability during storage increased with increase in blanching time although not in direct relation to peroxidase activity loss. Free sulphydryl was sensitive to heating and also decreased during storage of unblanched asparagus. However, there appeared to be stable fraction of free sulphydryls. AS

Tomatoes

356 Brackett (RE). Changes in the microflora of packaged fresh tomatoes. **Journal of Food Quality 11(2); 1988; 89-105**

In this investigation the microbial changes in tomatoes packaged by shrink wrapping in film or sealed in gas flushed film pouches are compared with those stored in the conventional packages. These samples were stored at 13 C and changes in populations of total aerobes, psychrotrophs, yeasts and molds, members of enterobacteriaceae and lactic acid bacteria were followed. The results revealed that shrink wrapping and gas packaging increased aerobic counts over control samples. Shrink wrapping selected for yeasts and molds and for lactic acid bacteria. The greatest number of psychrotrophs but the least number of yeasts and molds developed in unpackaged tomatoes. Shrink wrapped and gas packed tomatoes remained without spoilage for at least 6 wk whereas controls spoiled in 4 wk. NGKR

357 King (JR), Latham (WGH) and Spalding (DH). An analytical method for residues of imazalil in tomatoes and bell peppers after postharvest application and storage. **Journal of Agricultural and Food Chemistry 36(3); 1988; 520-523**

358 Shewfelt (RH), Thai (CN) and Davis (JW). Prediction of changes in colour of tomatoes during ripening at different constant temperatures. **Journal of Food Science 53(5); 1988; 1433-1437**

Vine-ripened and ethylene-treated tomatoes (cv.`Sunny') were ripened at 15, 18, 21 and 25 C and evaluated for colour using a colorimeter. Computer models were developed from the objective data to predict changes in colour components (value, hue angle, chroma). Computer-predicted results were then converted to sensory equivalent scores to provide a basis for quality management of tomatoes within a handling and distribution system. The models obtained reasonably estimated changes in vine-ripened tomatoes (cv.`Flora-Dade') ripened at 15, 21 and 25 C, but were less successful at predicting changes in ethylene-treated fruit. AS

359 Wahem (IA). The influence of the firmness of raw tomatoes on the physical, chemical and sensory characteristics of canned products. **Journal of Food Quality 11(2); 1988; 107-116**

The investigation was carried out to evaluate the effects of sorting raw tomatoes on the basis of firmness using a vibratory sorter on the physical- chemical and sensory characteristics of canned products. The sorted firm fruits were found to be higher in drained wt. Agtnon E-5 colour readings, total acidity, sodium hexametaphosphate soluble and sodium hydroxide soluble pectic substances and lower in pH, soluble solids/acid ratio, and water soluble pectin than soft and unsorted fruits. They were also found to be superior in flavour, texture and over all quality but inferior in colour showing thereby that sorted fruits when canned definitely improves their quality. NGKR

FRUITS

360 Smillie (RM), Hetherington (SE), Nott (R), Chaplin (GR) and Wade (NL). Application of chlorophyll fluorescence to the postharvest physiology and storage of mango and banana fruit and the chilling tolerance of mango cultivars. **ASEAN Food Journal** 3(2); 1987; 55-59

Changes in chlorophyll fluorescence **in vivo** were used (1) to follow the ripening of banana, (2) to follow the development of chilling injury in mango and banana fruit and (3) to screen mango cvs for chilling tolerance. In ripening banana fruit, the induced chlorophyll fluorescence recorded from the peel decreased because of both chlorophyll loss and a decrease in photosynthetic competence per unit chlorophyll. The chilling of green banana fruit at 0 C in polyethylene bags caused the induced chlorophyll fluorescence, measured as the rate of fluorescence rise (F_R) to decrease exponentially with a half-fall time 42 h. In non-chilled fruit kept at 13 C there was little change in F_R . In mango fruit the complete loss of induced fluorescence following storage at 0 C indicated that severed chilling injury had occurred whereas this did not happen in fruit stored at higher temp. using leaves chilled at 0 C the decrease in F_R was also used to assess relative chilling tolerances of 14 cvs of mango. of these, cvs originating in India were less tolerant of chilling stress than ones from Florida or Australia. AS

Apples

361 Curry (EA). Apple quality influenced by triazole growth retardants. **Journal of Food Quality** 11(2); 1988; 79-87

In this paper the results of a comparison of fruit quality from apple trees treated with either paclobutrazol or triapenthenol (RSW0411). This has been done by treating of 4 yrs old `Ace Delicious' apple trees on seedling rootstock with the above growth inhibitors. It was seen that fruit from trees treated with puclobutrazol were firmer and had higher soluble solids and lower acidity than both controls and fruit from RSW0411 treated trees. Values for fruit firmness, soluble solids and acidity from RSW0411 treated trees were between those of paclobutrazol and controls. Both compounds reached fruit length and increased fruit diameter. However length/diameter ratio was reduced 9% for paclobutrazol but only 5% for RSW0411. Neither compound reduced nor increased fruit disorders out of regular storage after 5 months at 0 C. NGKR

362 Oleszek (W), Lee (CY), Jaworski (AW) and Price (KR). Identification of some phenolic compounds in apples. Journal of Agricultural and Food Chemistry 36(3); 1988; 430-432

Five quercetin and two phloretin glycosides were isolated from apple skins. By chemical and spectral methods they were identified as quercetin 3-O-galactoside (hyperin), 3-O-glucoside (isoquercitrin), 3-O-xyloside (reynoutrin), 3-O-arabinoside (avicularin), and 3-O-rhamnoside (quercitrin), phloretin glucoside (phlorizin), and phloretin xyloglucoside. The glucosides of phloretin were also found in apple flesh. AS

Grapes

363 Valero (E), Varon (R) and Garcia-Garmona (F). Characterization of polyphenol oxidase from Airen grapes. Journal of Food Science 53(5); 1988; 1482-1485

Polyphenol oxidase (PPO) was isolated from grapes grown in Spain and its characteristics were studied. The partially purified enzyme had both cresolase and catecholase activities. Catecholase activity had a pH optimum in a range 3.5-4.5 and was characterized by a relatively high stability to heat. The apparent K_M for 4-methylcatechol was 9.5 mM. Cresolase activity presents a lag period which is modulated by different factors: enzyme concn. substrate concn., temp. or pH. The presence of o-diphenols in the reaction medium abolish the lag period, these acting as co-substrates. The apparent K_M towards p-cresol and the activation constant for o-diphenol for cresolase activity were 0.35 mM and 1.75 μ M, resp. AS

Mangoes

364 Jessup (AJ), Rigney (CJ) and Wills (PA). Effects of gamma irradiation combined with hot dipping on quality of "Kensington Pride" mangoes. Journal of Food Science 53(5); 1988; 1486-1488

Market mature "Kensington Pride" mangoes, dipped in a benomyl solution (500 p.p.m. a.i.) or in hot water at 52 C for 5 min. were irradiated in air at intervals of up to 42 h after dipping at doses up to 1000 Gray (GY). Irradiation retarded skin colouration, with a proportion of those dosed at 600 Gy and 1000 Gy not colouring normally, and some developing undesirable skin bronzing at 1000Gy. Irradiation did not affect flesh softening. Hot dip treatments accelerated skin colouration and the longer interval between dipping and irradiation the more this was evident. Irradiation delayed ripe fruit rot in mangoes. A hot benomyl dip in combination with irradiation between 75 Gy and 600 Gy preserved fruit quality with negligible adverse phytotoxic effects. AS

365 Zauberman (G), Fuchs (Y), Rot (I) and Wexler (A). Chilling injury, peroxidase, and cellulase activities in the peel of mango fruit at low temperature. HortScience 23(4); 1988; 732-733

Chilling injury (CI) developed on the peel of `Keitt' mango

(**Mangifera indica** L.) fruit that were stored at 5 C and consequently transferred to 20 C for ripening. Peroxidase and cellulase activities in the peel of such fruit rose during the development of CI to much higher levels than in nonchilled fruit. The activity of these two enzymes started to increase before any changes in total soluble solids and acid contents of the pulp could be observed. We suggest that the increase in activity of the two enzymes is part of the CI syndrome that develops during storage of mango fruit at chilling temp. AS

Papayas

366 Chan (HTJr) and Borbus (WBJr). Delayed light emission as a biochemical indicator of papaya heat treatment. **Journal of Food Science** 53(5); 1988; 1490-1492

Heat inactivation of the delayed light emission (DLE) system in papayas between 42 C to 48 C followed first order kinetics. However, between 49 C to 51 C heat inactivation was biphasic and both phases followed first order kinetics, indicating the presence of a heat-sensitive and heat-resistant component. Arrenhius plots suggested the existence of three different luminescence components in papayas. The heat stability of the most heat-resistant DLE may represent a chemical luminescence component not dependent on tissue integrity. DLE measurements provided a quantifiable, nondestructive means for measuring the primary deleterious effects of heat damage. AS

Peaches

367 Engel (K-H), Flath (RA), Buttery (RG), Mon (TR), Ramming (DW) and Teranishi (R). Investigation of volatile constituents in nectarines. 1 Analytical and sensory characterization of aroma components in some nectarine cultivars. **Journal of Agricultural and Food Chemistry** 36(3); 1988; 549-553

Volatile constituents of nectarines (**Prunus persica** L., Batsch var. nucipersica Schneid) were isolated by means of liquid-liquid extraction with ether and analyzed by capillary gas chromatography and gas chromatography-mass spectrometry. Aroma patterns (10 lactones, 8 C_6 aldehydes and alcohols, 8 terpenoids, 3 esters, 4 other compounds) were identified and (semi) quantified in four cvs. Besides C_6 components a series of saturated and unsaturated Alpha--and Delta-lactones ranging from chain length C_6 to C_{12} with concn. maxima for Alpha-and Delta-decalactone, were a major class of constituents. By detn. of odour thresholds and calculation of odour units the significance of lactones and other volatiles (e.g., linalool) to the aroma of nectarines was investigated. AS

368 Takeoka (GR), Flath (RA), Guntert (M) and Jennings (W). Nectarine volatiles Vacuum steam distillation versus headspace sampling. **Journal of Agricultural and Food Chemistry** 36(3); 1988; 553-560

Quince

369 Winterhalter (P) and Schreier (P). 4-Hydroxy-7,8-dihydro Beta-ionoal. Natural precursor of theaspiranes in quince fruit (Cydonia oblonga, Mill). Journal of Agricultural and Food Chemistry 36(3); 1988; 560-562

In a polar fraction of an extract obtained from quince fruit juice (Cydonia oblonga, Mill) by solvent extraction (pentane-dichloromethane, 2:1) and subsequent LC separation on silica gel, capillary gas chromatography (HRGC), and coupled HRGC techniques, i.e. on-line mass spectrometry (HRGC-MS) and Fourier transform infrared spectroscopy (HRGC-FTIR), the occurrence of 4-hydroxy-7,8 di-hydro Beta-ionol was revealed. The identification was verified by comparison of HRGC, HRGC-MS, and HRGC-FTIR data of the natural product with those of an authentic reference compound synthesized from-4-oxo-ionol. Model reactions carried out with 4-hydroxy-7,8-dihydro-Beta-ionol under high-vacuum distillation extraction conditions (40 C , 5h) showed the easy formation of theaspiranes at pH 3.5. The mechanism of theaspirane formation from 4-hydroxy-7,8-dihydro-Beta-ionol can be considered as "prototropic dehydration of an allyl-1, 6-diol" as previously described for monoterpene diols. AS

CONFECTIONERY, STARCH AND SUGAR

Confectionery

Chocolates

370 Tscheuschner (HD) and Markov (E). Examination of the texture of chocolate. (Part I). Lebensmittelindustrie 35(3); 1988; 127-131 (De).

The relations of sensory and instrumental detn. of texture parameters are dealt with and the influence of the recipe and process parameters on texture is examined. BV

Cocoa

Cocoa fat

371 Szelag (H) and Zwierzykowski (W). Evaluation of behenic acid tryptamide in cocoa fat on the basis of blue value determinations. Nahrung 32(3); 1988; 285-290

Two analytical methods for the detn. of shell lipids contents in cocoa fat as blue value (BV) were compared. It has been determined that for the same analysed sample the BV varies depending on the analytical methods used. To compare both the methods, the shell lipids and the pure cocoa fat (without shell lipids) were isolated and mathematical correlations of BV as a function of shell lipids content have been derived. Statistical evaluation of the results was presented too. AS

BAKERY PRODUCTS

372 Falcone (RG) and Dixon Phillips (RO). Effects of feed composition, feed moisture, and barrel temperature on the physical and rheological properties of snack-like products prepared from cowpea and sorghum flours by extrusion. Journal of Food Science 53(5); 1988; 1464-1469

Decorticated meals made from grain sorghum and cowpeas and 33-67% blends of the two were hydrated to 20.5, 23.0, and 25% moisture and extruded at 175, 190, and 205 C. Effects of composition, feed moisture, and barrel temp. on product temp. residence time, expansion ratio, unit bulk density, product moisture, Warner-Bratzler shear force, stress and energy and sensory hardness and brittleness were determined. Most properties could be described by a generalized second order model. Individual models differed widely; however, composition (or its interaction terms) was significant in most cases in which it was a variable. Considering all compositions, temp. was most often significant. Effect of moisture was more significant as the proportion of cowpea in the mixtures increased. Textural properties were compared to those of three commercial snack foods. Experimental extrudates were somewhat tougher than commercial snacks although not drastically different from them. AS

Bread

373 Johnson (PE) and Lykken (GI). Copper-65 absorption by men fed intrinsically and extrinsically labeled whole wheat bread. Journal of Agricultural and Food Chemistry 36(3); 1988; 537-540

Six men were fed a diet composed of conventional foods with all bread as whole wheat bread. Intrinsically labelled ^{65}CU bread (containing 6.5 p.p.m. Cu and 48 atom % ^{65}Cu) was substituted for unlabeled bread for 3 days, and stools were collected for 24 days. Extrinsically labeled bread was then substituted for 3 days and another 24-day stool collection made. ^{65}Cu excretion was measured by mass spectrometry. Mean Cu intake was 1.10 mg of Cu/day. Average Cu balance was -0.06 plus or minus 0.08 mg/day. Average absorption of the intrinsic copper was 72.2 plus or minus 9.3% and of extrinsic Cu 64.2 plus or minus 5.8%. The ratio of extrinsic to intrinsic absorption was 0.906 plus or minus 0.164. Absorption of intrinsic and extrinsic tracers did not differ significantly (P > 0.05) by a paired t-test, and the ratio (E/I) was not significantly different from I. Use of extrinsic Cu tracers to assess Cu absorption is supported by these results. AS

Cakes

374 Crawford (C). Semi-quantitative determination of monoglycerides in cake. Flour Milling and Baking Research Association Bulletin ; 1988; 179-182

Outlines a simple method using thin layer chromatography which should be suitable for routine analysis for this emulsifier. AS

MILK AND DAIRY PRODUCTS

375 Batish (VK), Chander (H), Zumdegni (KC), Bhatia (KL) and Singh (RS). Antibacterial activity of lactoferric against some common food borne pathogenic organisms. **Australian Journal of Dairy Technology** 43(1); 1988: 16-18

Effect of lactoferrin on E. coli, **Salmonella typhimurium** and **Shigella disenteriae** were studied. Addition of 0.02 mg/ml of lactoferrin resulted in gradual decline of growth. It decreased the time of log phase. Growth inhibition in **E. coli, Salmonella typhimurium** and **Shigella dysenteriae** was 92, 78 and 72% resp. JSS

376 Cavanaugh (JR). Elimination of lactose interference in the determination of available lysine using fluorine 19 nuclear magnetic resonance spectroscopy. **Journal of Dairy Science** 71(5); 1988; 1147-1151

Presence of lactose interferences during estimation of Epsilon-amino group lysine residues with NMR spectroscopy. In this method lactose was removed by dialysis and results obtained indicated presence of Epsilon-amino groups equal to those of pure proteins. The modified method as tested with non-fat dry milk gives excellent agreement with results obtained from a Kabade-Liener method. JSS

377 Martinez (SB) and Speckman (RA). Beta-galactosidase treatment of frozen dairy product mixes containing whey. **Journal of Dairy Science** 71(4); 1988; 893-900

Twenty-five per cent of the milk SNF in mixes of ice cream, ice milk, milk shake, and low calorie frozen dessert were substituted with sweet whey solids. The mixes were treated with a Beta-galactosidase enzyme prior to pasteurization. Demineralized and undemineralized whey powders had the same effect on enzyme activity and flavour quality of the product. Increased sweetness due to hydrolysis products of lactose allowed for reduction in sucrose and corn syrup solids in the formulas while maintaining sweetness equivalent to standard formulas. Freezing points were determined by cryoscopy and were correlated to the degree of hydrolysis. Experimental samples with and without enzyme treatment were comparable in meltdown, storage stability, and overrun of standard samples. Sensory qualities were likewise similar to the standard formulas. AS

Milk

378 Cheng (SG), Ursula Koch) and Brunner (JR). Characteristics of purified cow's milk xanthine oxidase and its submolecular characteristics. **Journal of Dairy Science** 71(4); 1988; 901-916

379 Harvey (J). A high performance liquid chromatography. Method for lactose determination in milk. **Australian Journal of Dairy Technology**

43(1); 1988; 19-20

Bio-Rad HPX-87P ion exchange column at 85 C; using purified water, Bigg's solution for precepitation of milk proteins, melezitos, as internal standard and lactose monohydrate as standard. Lactose content of 30 samples ranged between 4.15-5.75%, mean lactose content of 4.674% Standard Deviation of Difference 0.066% and coeff. of variation 1.4%. JSS

380 Kulozik (U) and Kessler (H-G). Permeation rate during reverse osmosis of milk influenced by osmotic pressure and deposit formation. Journal of Food Science 53(5); 1988; 1377-1383

During the concn of milk by reverse osmosis deposited layers are formed on the membrane which constitute an additional resistance to permeation. Permeation is seen as mass flow through two resistance, namely laminar flow through the deposited layer and transport by diffusion through the membrane. A comparison of reverse osmosis of pure milk protein solutions and skim milk showed that inorganic ions increased the resistance to flow of the deposited layer considerably. The pressure loss through the deposited layer delta P_L was found by experiment. By means of regression analysis, mathematical relationships could be obtained to describe the effects of the processing variables on it. AS

381 Moats (WA). Inactivation of antibiotics by heating in foods and other substrates. A review. Journal of Food Protection 51(6); 1988; 491-497

The review gives an account of available data relating to inactivation of certain antibiotics such as chlorotetracycline, oxytetracycline, streptomycin, penicillin-G and neomycin in milk, phosphate buffer, water, milk and water, meat extracts, etc. The data also includes effect of various cooking and processing procedures of meat and egg and sausages on inactivation of antibiotics. Ordinary ways of cooking meat even to "well done" cannot be relied on to inactivate even more heat sensitive penicillin and tetracycline. More drastic cooking as in canning or extended cooking might inactivate the more sensitive compounds. CTD

382 Wetting (K), Proksch (A), Broschinski (L), Diener (W), Fischer (G) and Namaschk (A). Investigations on the nitrate and nitrite content in human milk. Nahrung 32(3); 1988; 301-303 (De).

383 Wheeler (SM), Mckay (B) and Nguyen (MH). The effect of evaporation and spray drying upon total and ionic fluoride concentration in milk. Australian Journal of Dairy Technology 43(1); 1988; 1-5

384 Wheeler (SM), Turner (AD) and MacFarlane (J). Comparison of four methods used to measure total fluoride and one method for ionic fluoride in bovine milk, using the fluoride ion selective electrode. Australian Journal of Dairy Technology 43(1); 1988; 21-25

Four methods of measuring total fluoride in milk were compared with each other and with one method for measuring ionic fluoride in milk. All methods gave high recoveries (99.1%-99.9%) but gave differing values (0.01-0.14 mg/L) for the total fluoride content of unspiked milk. Values for ionic fluoride were 46-64% of total fluoride. A computer curve was used to eliminate errors encountered in hand-drawing standard curves. AS

Milk products

Cheese

385 Kuppers (FJEM) and Jans (JA). Reverse-phase liquid chromatographic determination of benzoic and sorbic acids in fresh cheese. Journal of the Association of Official Analytical Chemists 71(5); 1988; 1068-1071

386 Pommert (JF), Klaebe (A), Perie (J), Lebugle (A) and Puech (J). Observation and analysis of crystalline phases in processed cheese. Journal of Food Science 53(5); 1988; 1367-1369, 1447

Crystals in four kinds of processed cheese were investigated and found to depend upon the salt used in the melting process. Transmission and scanning electron microscopy, in situ X-ray diffraction, infrared spectroscopy and EDX analysis were used to reveal the presence of crystalline monoclinic calcium pyrophosphate dihydrate in addition to calcium phosphate. AS

387 Tsai (WJ), Liewen (MB) and Bullerman (LB). Toxicity and sorbate sensitivity of molds isolated from surplus commodity cheeses. Journal of Food Protection 51(6); 1988; 457-462

A total of 263 mold isolates were obtained from moldy surplus cheese released from government storage for distribution in the surplus commodity food distribution program in 1984. All of the molds belonged to the genus Penicillium, and consisted of four sp. P. roqueforti (176) P. cyclopium, (46), P. viridicatum (32), and P. crustosum (9). About 10% of the isolates were capable of producing known mycotoxins on lab. media. The mycotoxins detected were patulin, penicillic acid and ochratoxin. Patulin was detected most often followed by penicillic acid and ochratoxin. When tested in chicken embryos, 10.1% of the isolates were toxic (causing 50% mortality or more) when grown on cheese, and 29.7% of the isolates were toxic when grown on rice. There was no correlation between having the ability to produce known mycotoxins and toxicity to chicken embryos. None of the isolates when grown on cheese contained any mutagenic activity in the Salmonella mutagenesis (Ames) test. The percentage of isolates showing a high or medium degree of resistance to sorbate were 77, 45, 3.6 and 0 at sorbate concn of 0.30, 0.45, 0.60 and 0.90%, resp. There was no apparent relationship between sorbate resistance and toxigenic properties of the molds. AS

Cheedar cheese

388 Fedrick (IA) and Fuller (SC). Comparison of calf rennet and modified Mucor miehei coagulant in Cheddar cheese. Australian Journal of Dairy Technology 43(1); 1988; 12-15

Calf rennet and Rennilase 50L x L have been compared for production of Cheddar cheese for maturation, manufacturing, compositional, microbiological and yield characteristics. It was found that there were no differences in the quality and yield of Cheddar cheese prepared with either of the enzyme preparations. JSS

Manchego-type cheese

389 Blanco (JL), Dominguez (L), Gomez-Lucia (E), Garayzabal (JFF), Goyache (J) and Suarez (G). Behavior of aflatoxin during the manufacture, ripening and storage of Manchego-type cheese. Jóurnal of Food Science 53(5); 1988; 1373-1376

The behaviour of aflatoxins B_1, B_2, G_1, G_2 and M_1 was investigated during manufacture, ripening, refrigeration, and frozen storage of Manchego-type cheese. More aflatoxins (per wt. or vol.) occurred in curd than in whey, although total quantity was greater in whey. Aflatoxins B_1, B_2, and M_1 remained stable during ripening, but G_1 and G_2 levels increased. Concn of B_1, B_2 and M_1 decreased after 15 and 30 days refrigeration storage, but after 60 days 100% recovery occurred in the inner portion and only 60% in the outer. Concn of G_1 and G_2 also decreased during the first 30 days, but on day 60 an increase was observed, 200% in the inner and 120% in the outer portions. Aflatoxins were stable after 90 days in frozen storage. AS

Milk powders

390 Kieseker (FG) and Aitken (B). An objective method for determination of heat stability of milk powders. Australian Journal of Dairy Technology 43(1); 1988; 26-31

Skimmed milk powder (SMP) was reconstituted to a concn of 20% under standard conditions. Samples were put in stainless steel tubes with air tight jars. One set was heated in a retort to a temp. of 120 C for 20 min. and viscosity measured with a Brookfield viscometer. Second set was heated in an oil bath and tubes removed after an interval of 2 min., coagulation at a given time was noted. Second method gave comparable results with processing conditions. Factors like water composition, product composition, blending of SMP batches, additives, homogenization, stabilization, sterilization and storage conditions of powder were found to influence heat stability of reconstituted SMP. JSS

391 N'soukpoe-Kossi (CN), Martel (R), Leblanc (RM) and Paquin (P). Kinetic study of Maillard reactions in milk powder by photoacoustic spectroscopy. Journal of Agricultural and Food Chemistry 36(3); 1988; 497-501

Application of photoacoustic spectroscopy (PAS) to the analysis of milk or dairy products is reported. We have studied the kinetic aspects of the Maillard browning reactions in milk powder tablets. The reaction rate has been assessed by using the spectral ratio I_{33} /I_{280} (i.e., the PA intensity of the Maillard reaction products to that of proteins). The molar energy and enthalpy of activation were found to be 115 and 113 kj mol^{-1} at 298 K, resp. We discuss the relevance of the application of photoacoustic methodology in dairy research and the milk industry. AS

Whey

392 Joseph (MSB) and Mangino (ME). Contribution of milk but fat globule membrane proteins to the effective hydrophobicity of whey protein concentrates. **Australian Journal of Dairy Technology 43(1); 1988; 6-8**

Proteins hydrophobicity has been found to determine protein functionality involving emulsification. Heptane binding is the method of choice for detn. of protein hydrophobicity. SDS-polyacrylamide gel electrophoresis was used for quantitation of membrane proteins in whey protein conc. (WPC). Fat globule membrane was found to bind 0.956 g heptane per gram of protein against 0.05 µ g heptane per gram of Beta-lactoglobulin. Influence of pH was found reversible. Data has been presented to show that heptane binding capacity of WPC is directly proportional to fat globule membrane content. JSS

393 Joseph (MSB) and Mangino (ME). The effect of milk fat globule membrane protein on the foaming and gelation properties of Beta-lactoglobulin solutions and whey protein concentrates. **Australian Journal of Dairy Technology 43(1); 1988; 9-11**

The addition of from 2 to 6 mg of milk fat globule membrane (MFGM) protein to solutions of Beta-lactoglobulin was shown to increase the strength of thermally induced gels made from the proteins. The addition of more than 6 mg MFGM protein per gram of Beta-lactoglobulin caused a decrease in gel strength. MFGM content of 8 whey protein conc. (WPC) was shown to be positively correlated to gel strength. The addition of MFGM protein to either commercial egg white protein or to WPC caused a large decrease in overrun and foam stability. There were negative correlations between MFGM protein content and the foaming properties of whey protein conc. It was demonstrated that the effects were due to the protein portion of MFGM and not to residual lipid. AS

394 Patocka (J) and Jelen (P). Enzymatic lactose hydrolysis for prevention of lactose crystallization in a whey spread. **Journal of Food Science 53(5); 1988; 1370-1372**

395 Tang (I-C), Yang (S-T) and Okos (MR). Acetic acid production from whey lactose by the co-culture of **Streptococcus lactis and Clostridium formicoaceticum. Applied Microbiology and Biotechnology 28(2); 1988; 138-143**

Whey permeate

396 El-Samargy (YA) and Zall (RR). The influence of sodium chloride on the activity of yeast in the production of single cell protein in whey permeate. **Journal of Dairy Science 71(5); 1988; 1135-1140**

Cheddar cheese whey permeates containing 3, 6 or 9% of sodium chloride was used to evaluate biomass production by nine different lactose fermenting yeasts. Yeasts were cultured in shake flasks at pH of 5 and 32 C temp. **Kluyveromyces marxianus** var. **marxianus** ATCC 28244 and **Candida tropicalis** ATCC 20401 were more efficient in biomass production. JSS

Whey proteins

397 De Wit (JN). Empirical observations and thermodynamical considerations on water-binding by whey proteins in food products. Journal of Food Science 53(5); 1988; 1553-1557, 1559

Basic protein knowledge is used to explain protein functionality in food products. Empherical observations on the water-binding capacity of whey protein conc. and gelation during cooling in set yoghurt and during sterilization of meat products are discussed in terms of effects of temp. on the structure and thermodynamic behavior of their main protein isolates: Alpha-Lactalbumin and tropocollagen, resp. It appears that the water-binding of proteins is governed by their thermally induced folding behaviour. In particular, the greater tendency of whey proteins to fold at low temp. due to hydrophobic effects, and to remain dispersed at high temp. as a result of disorder effects, keeps these proteins from water-retention in a network structure during cooling and sterilization. AS

Yoghurts

398 Sirogusa (GR) and Johnson (MG). Persistence of **Listeria monocytogenes** in yoghurt as determined by diret plating and enrichment methods. International Journal of Food Microbiology 7(2); 1988; 147-160

Listeria Selective Isolation Agar (LSI) and Modified Acriflavin Ceftazidime Esculin Agar (MACE) were compared to McBride Listeria Agar minus Blood (MLA-B) for ability to recover Listeria monocytogenes Scott A cells inoculated into commercial yoghurt. pH 4.1 Yoghurt was stored at 5 C and sampled periodically over a 12 days period. LSI, MACE and MLA-B inhibited the growth of the two yoghurt organisms but LSI and MACE gave better inhibition of other separately tested gram-positive bacteria likely to be present in other fermented foods. Acid-stressed Listeria monocytogenes Scott A cells were optimally recovered by enrichment at 5 C for 5-18 days in 0.1 M phosphate buffer, pH 7.2 followed by transfer to tryptic soy broth + 0.5% yeast extract at 30 C for 2 days. At low inoculum levels (10^2 cells/g yoghurt), they were not detectable by direct plating or enrichment of yoghurt after day 0. At high inoculum levels (10^2 cells/g yogurt), they were detectable up to day 6 but not at day 9 by direct plating on MLA-B, LSI or MACE with log counts per gram of yoghurt being about 10 fold higher on LSI than on MACE or MLA-B. The above enrichments procedure permitted recovery on MLA-B, LSI, or MACE of viable Listeria cells from the day 9 samples found negative by direct plating. AS

MEAT AND POULTRY

Meat

399 Holley (Y (A) and Millard (GE). Use of MSRD medium and the hydrophobic grid membrane filters technique to differentiate between pediococci and lactobacilli in fermented meat and starter cultures. International Journal of Food Microbiology 7(2); 1988; 87-102

Modifications of MRS medium were made by incorporation of 0.1 M L-arginine HCl, 0.0025% phenol red, 100 IU polymyxin B sulphate, by deletion of meat extract, use of only 1.2% (w/v) glucose and increase of Mn to 1000 p.p.m. In addition, adoption of the hydrophobic grid membrane filter (HGMF) systems with 0.025% Fast Green FCF dye and adjustment of the agar medium to pH 5.5 gave MRSD (differential) medium. Incubation at 25 C anaerobically under nitrogen or carbon dioxide followed by a post-growth staining procedure involving use of 0.4% (w/v) bromocresol purple yielded conditions under which pediococci colonies were blue whereas homo- and heterofermentative lactobacilli were green in colour. Under these conditions, 7 pediococci, 16 lactobacilli, and 18 commercial meat starter cultures were successfully analyzed by plate count to yield a differential assessment of the lactobacilli and pediococci present without interference from the 9 other genera tested. Streptococcus lactis and Leuconostoc spp. produced blue and green colonies, resp., at 25 C which might interfere but these organisms are not present in significant nubmers in fermented meats. Pediococcus parvulus and Streptococcus faecalis produced green and blue colonies resp., but their very poor growth at 25 C prevented their interference. Use of the developed MRSD medium was described for enumeration of both pediococci and lactobacilli in starter cultures and in fermenting dry sausages to enable documentation of starter cultures performance. AS

400 Knipe (CL), Olson (DG) and Rust (RE). Effects of inorganic phosphates and sodium hydroxide on the cooked cured colour, pH and emulsion stability of reduced-sodium and conventional meat emulsions. Journal of Food Science 53(5); 1988; 1305-1308

Phosphates that increased meat emulsion stability the most also caused the highest decrease in cured colour development. The addition of 0.125% sodium hydroxide also reduced cured colour development. Holding uncooked emulsion, containing either sodium tripolyphosphate or tetrasodium pyrophosphate, up to 60 min after emulsion preparation plus adding tetrasodium pyrophosphate later in the emulsification procedure improved cured colour development upon cooking. In both cases, cooked pH increased as cured colour improved, and emulsion stability declined. This suggested that phosphate effects other than, or in addition to, pH were involved in cured colour development and emulsion stability. AS

401 Mattila (T), O'Boyle (D) and Frost (AJ). Inability to transfer antibiotic resistance in Escherichia coli on meat surfaces. Journal of

Food Science 53(5); 1988; 1309-1311

The surfaces of beef and chicken samples were inoculated with a mixtures of a donor (resistant to tetracycline, streptomycin, chloramphenicol, ampicillin, neomycin and sulphonamide), and a recipient strain of **Escherichia** coli. Meats were maintained at 20 C and 4 C and sampled daily. Transfer of antibiotic resistance could not be demonstrated at either temp. The recipient strain survived without significant growth at 4 C, but failure to transfer antibiotic resistance at 20 C was considered to be due to the sessile growth of the organisms enclosed in a dense glycocalyx, precluding close contact between the organisms. **AS**

402 Seman (DL), Drew (KR), Clarken (PA) and Littlejohn (RP). Influence of packaging method and length of chilled storage on microflora, tenderness and colour stability of venison lions. **Meat Science** 22(4); 1988; 267-282

Beef

403 Berry (BW) and Leddy (KF). Effects of hot processing patty formation before or after freezing thawing and soy usage on various properties of low fat ground beef. **Journal of Food Quality** 11(2); 1988; 159-171

404 Clarke (AD), Sofos (JN) and Schmidt (GR). Influence of varying pH and algin/calcium binders on selected physical and sensory characteristics of structured beef. **Journal of Food Science** 53(5); 1988; 1266-1269, 1277

405 Johnson (RC), Chem (CM), Muller (TS), Costello (WJ), Romans (JR) and Jones (KW). Characterization of the muscles within the beef forequarter. **Journal of Food Science** 53(5); 1988; 1247-1250, 1257

406 Mikel (WB), Rogers (RW) and Althen (TG). Some effects of various methods of processing on the characteristics of tumbled cured beef. **Journal of Food Science** 53(5); 1988; 1570-1571

407 Oreskovich (DC), McKeith (FK), Carr Jan Nova kofski (TR) and Bechtel (PJ). Effects of different aging procedures on the palatability of beef. **Journal of Food Quality** 11(2); 1988; 151-158

408 Paterson (BC), Parrish (FCJr) and Stromer (MH). Effects of salt and pyrophosphate on the physical and chemical properties of beef muscle. **Journal of Food Science** 53(5); 1988; 1258-1265

Beef steaks

409 White (FD), Resurreccion (AVA) and Lillard (DA). Effect of warmed-over flavour on consumer acceptance and purchase of precooked top round steaks. **Journal of Food Science** 53(5); 1988; 1251-1252, 1257

Bovines

410 Koohmaraie (M), Babiker (AS), Merkel (RA) and Dutson (TR). Role of Ca dependent proteases and lysosomal enzymes in postmortem changes in bovine skeletal muscle. Journal of Food Science 53(5); 1988; 1253-1257

Mutton

Goat

411 Padda (GS), Keshri (RC), Sharma (N), Sharma (BD) and Murthy (TRK). Physico-chemical and organoleptic properties of patties from hot, chilled and frozen goat meat. Meat Science 22(4); 1988; 245-253

The effects of processing hot versus chilled goat meat, as such and after freezing in chunk or mince forms were studied in relation to physico-chemical and organoleptic properties of patties. The differences in the pH of the meat samples were non-significant ($P < 0.05$) at 3-4 h post mortem (PM) at room temp. (30 C) and after 24 h at 4 C. The yield of the broiled patties, prepared from hot meat at 3-4h PM, was significantly lower ($P < 0.05$) as compared to those from chilled meat. However, this trend was reversed, if processing of hot meat into patties was done within 1-2 h PM. Freezing of chilled meat in chunk or mince forms gave significantly higher ($P < 0.05$) cooking yields than freezing of hot meat in similar forms. The organoleptic scores of the raw-cooked patties were similar for all treatments. Freezing of precooked patties at -10 C for 10 days, thawing and reheating did not reduce most of the sensory scores significantly ($P < 0.05$). Moisture, protein and fat contents of the broiled patties were not significantly ($P < 0.05$) affected by the treatments. Standard plate count of hot versus chilled meat, for all levels of processing and storage, were within acceptable limits. AS

Pork

412 Chen (CM) and Jones (KW). Chemical, sensory and microbiological properties of cured pork and turkey ham products. Journal of Food Science 53(5); 1988; 1273-1227

413 Marriott (NG), Phelps (SK) and Graham (PP). Restructured pork chops with added turkey thighs. Journal of Food Quality 11(2); 1988; 129-138

414 Marriott (NG), Shook (BT), Graham (PP) and Boling (JW). Flavour adjuncts for restructured pork. Journal of Food Quality 11(2); 1988; 139-149

415 Prabhu (GA), Molins (RA), Kraft (AA), Sebranek (JG) and Walker (HW). Effect of heat treatment and selected antimicrobials on the shelf-life and safety of cooked, vacuum-packaged, refrigerated pork chops. Journal of Food Science 53(5); 1988; 1270-1279, 1326

Products

Ham

416 Andersen (HJ), Bertelsen (G), Boegh-Soerensen (L), Shek (CK) and Skibsted (LH). Effect of light and packaging conditions on the colour stability of sliced ham. **Meat Science** 22(4); 1988; 283-292

The colour fading of sliced ham displayed in chill cabinets has been found to be caused by the combined action of light and oxygen, and can be prevented by a combination of packaging in a plastic material with low oxygen transmission rate (OTR < 4 Cm /m 24 h/atm), a high initial vacuum level (> 99%), and cold storage in the dark until residual oxygen in the packaging has been consumed (4 days for > 99% initial vacuum). UV-light permeability of the packaging material had no effect on colour stability. The colour was measured by tristimulus colorimetric measurements on the surface of ham packaged in packaging material with different OTR (60 and < 4 cm m /24 h/atm) and UV-light permeability (transparent above 360 and above 250 nm), and the change in colour was monitored by the Hunter a value, the tristimulus colorimetry parameter found (by analysis of variance) to give the best correlation with the subjectively evaluated ham colour. For each of the four types of packaging material, three different initial vacuum levels (85, 95 and > 99%) were used. AS

417 Magnus (CA), McCurdy (AR) and Ingledew (WM). Further studies on the thermal resistance of Streptococcus faecium and Streptococcus faecalis in pasteurized ham. Canadian Institute of Food Science and Technology Journal 21(2); 1988; 209-212

Poultry

418 Barbut (S). Microstructure of reduced salt meat batters as affected by polyphosphates and chopping time. Journal of Food Science 53(5); 1988; 1300-1304

Microstructural and textural changes due to salt reduction (2.5% to 1.5%), 0.4% tripolyphosphate (TPP), hexametaphosphate (HMP) or sodium acid pyrophosphate (SAPP) addition and chopping time (40 vs 100 cutter revolutions) were studied in poultry meat batters. Salt reduction significantly increased liquid and fat losses in the long chopping but not in the short chopping treatments. Scanning electron micrographs of reduced salt batters revealed fat globules which lost fat during cooking. HMP and SAPP addition significantly improved emulsion stability. Average fat globule size decreased as chopping time increased and/or salt decreased. Hardness was higher in the NaCl treatments in the short chopping as compared to the long chopping. The opposite was observed when phosphates were added. AS

419 Kanner (J), Hazan (B) and Doll (L). Catalytic "free" iron ions in muscle foods. Journal of Agricultural and Food Chemistry 36(3); 1988; 412-415

Catalytic "free" iron was determined in muscle foods by the bleomycin method. The results demonstrated that turkey and chicken muscle contain significant amount of free catalytic iron. Base propenal derived from DNA during the incubation of bleomycin with muscle water extracts was inhibited by the iron chelator desferrioxamine. The amounts of free iron in turkey and chicken dark muscles were found to be 2.5 and 0.5 u g/g, and those of light muscles, 0.9 and 0.2 u g/g resp. The amount of free iron in turkey and chicken dark muscle correlates well with the tendency of this muscles tissue to undergo lipid peroxidation. Turkey and chicken dark and white muscle stored at 4 C for 1 wk releases free iron, ions, the concn. of which increases by 2-3 fold over fresh samples. The implication of free iron in the quality of muscle foods is discussed. AS

Chickens

420 Huber (DG) and Regenstein (JM). Emulsion stability studies of myosin and exhaustively washed muscle from adult chicken breast muscle. Journal of Food Science 53(5); 1988; 1282-1286, 1293

An exhaustively washed chicken breast muscle fraction formed a stable emulsion despite the absence of any soluble material. Measurements of the oil droplet size suggested that about 1 mg of myosin was available per square meter of oil droplet surface. This was less than the amount required to fully cover the surface of the oil droplets and suggested that the classical emulsification theory did not hold for meat `emulsion' products. The formation of a matrix (gel) in the aqueous phase might be a significant contributor towards stabilizing meat sausage-type products. AS

421 Tanticharoenkiat (O), Chastain (MF) and Lane (HW). Selenium content of chicken meat as affected by cooking. Journal of Food Science 53(5); 1988; 1294-1295, 1376

Twelve dressed chickens of the same flock were quartered and prepared by four cooking treatments: microwaving, conventional oven cooking, broiling, and panfrying. The mean value of Se. (fluorometric method) in raw chicken was 0.38 u g/g dry wt. with no significant differences between white and dark meat. There was insignificant loss of Se due to cooking. Cooked chicken breast had a significantly higher level of dialysable Se compounds (MW < 2000 daltons) than raw chicken. AS

Broilers

422 Kim (JW), Fletcher (DL) and Campion (DR). Effect of electrical stunning and hot boning on broiler breast meat characteristics. Poultry Science 67(4); 1988; 674-676

Studies were conducted to investigate the effects of electrical stunning and hot boning on selected characteristics of broiler breast muscle. Electrical stunning resulted in a significantly higher muscle pH up to 1 h post-mortem after which no difference between stunned and non-stunned birds was noted. Electrical stunning also produced a significantly greater emulsification capacity but had no effect on sarcomere length, percentage moisture, water holding capacity, cook loss or percentage protein. Hot boning resulted in significantly shorter sarcomere lengths and increased meat toughness, but electrical stunning appeared to ameliorate these adverse effects. Hot boning also caused a significant decrease in percentage moisture and emulsification capacity. AS

Turkeys

423 King (AJ) and Earl (LA). Extraction of protein from slurries of unfrozen and frozen/thawed dark, ground turkey meat and skin with selected potassium and sodium salts. Journal of Food Science 53(5); 1988; 1290-1294

Patty formulations were made from dark, ground turkey meat, skin and selected sodium and potassium salts. Slurries made from unfrozen and frozen/thawed formulations were analyzed for pH and sediment. Supernatant from slurries was analyzed for protein and electrophoretic components. Sediment from extracts generally increased as pH increased for both storage conditions. No association between pH and protein in the supernatant of slurries was observed. Neutral and alkaline polyphosphates combined with NaCl extracted ($P < 0.05$) more protein than other combinations of salts. Patterns of sodium dodecyl sulphate polyacrylamide gels showed that sodium pyrophosphate glassy sodium polyphosphate (0.5%) extracted 9 protein bands while NaCl (2.0%) extracted 13 protein bands. AS

Products

Eggs

424 Baker (RC) and Scoot-Kline (D). Development of high protein coating using egg albumen. Poultry Science 67(4); 1988; 557-564

Experimental batters containing 75 to 87% liquid egg albumen or 24.5% dried egg albumen were mixed by hand and applied to predusted, phosphate-soaked broiler drumsticks. Pieces were then rolled in breading and cooked by the fry/oven method. During development, batters were evaluated by analysis of fat and moisture of cooked coatings, measurement of coating pickup and exterior colour, observation of interior colour, and textural qualities of cooked coatings, and measurement of organoleptic acceptability of battered broiler pieces. Batters consisting of egg albumen combined with pregelatinized or modified corn flours produced coatings with acceptable exterior and interior colour. Batters with higher solids contents tended to absorb less fat, but batters containing pregelatinized corn flour with relatively lower solids contents also produced cooked coatings that had high moisture contents and absorbed little fat. Percentage of coating pickup and yield values of chicken pieces were acceptable. Liquid and dried egg albumen perfromed equally well in batters. Both experienced and student taste panelists gave good ratings to broiler drumsticks coated with high egg albumen batters. Breading applied after the batter reduced percubberiness and greasiness. Partial lack of adhesion of the cooked coating to the chicken pieces was a problem.

Precooked, frozen drumsticks could be successfully reheated in a microwave oven. AS

425 Wehling (RL), Pierce (MM) and Froning (GW). Determination of moisture, fat and protein in spray-dried whole egg by near infrared reflectance spectroscopy. Journal of Food Science 53(5); 1988; 1356-1359, 1443

Near infrared reflectance (NIR) spectroscopy was used to measure moisture, protein, and fat in spray-dried whole egg. Calibrations were developed for a commercial, filter monochromator NIR instrument and tested against standard methods. A standard error of performance (SEP) of 0.15% was obtained for moisture using a calibration based on three wavelengths. Protein and fat detn. by NIR were susceptible to variability due to samples particle size differences. Calibrations employing three wavelength were used to measure protein and fat in samples of uniform particle size (SEP = 0.20% and 0.28%, resp.), but it was necessary to utilize additional wavelengths to adequately measure these constituents in samples having particle size variability (SEP = 0.38%) for both protein and fat. AS

Egg yolks

426 Carrillo (AR) and Kokini (JL). Effect of egg yolk and egg yolk + salt on rheological properties and particle size distribution of model oil-in-water salad dressing emulsions. Journal of Food Science 53(5); 1988; 1352-1355, 1366

The role of egg yolk and egg yolk + salt in stabilizing oil-in-water (o/w) salad dressing emulsions pre-stabilized with xanthan and propylene glycol alginate was studied using creep tests, steady shear, and particle size analysis. Results show that each combination significantly affects rheological stability of model o/w salad dressing emulsions. All emulsions exhibited viscoelasticity and were characterized by three parameters; Eta_1 , E_1 and Eta_N . Steady shear measurements showed that both egg yolk and salt increased viscosity, radically. Particle size data showed significant changes with both addition of egg yolk and salt to the model system. AS

SEAFOODS

427 Gerba (CP). Viral disease transmission by seafoods. **Food Technology** 42(3); 1988; 99-103

Nature and epidemiology of transmission of viruses by shellfish has been discussed. This article points out that the safety analysis of seafoods for microbial contamination does not cover virus detection. It has been proposed that gene probes significantly reduces the cost and time for assay and may allow for more routine monitoring for enteric viruses in shellfish in future. GAR

428 Lloyd (R). Hazard assessment from toxicity test results on marine species. Chemistry and Industry ; 1988; 12-15

429 Spencer Garrett (E). Microbiological standards, guidelines, and specifications and inspection of seafood products. Food Technology 42(3); 1988; 90-93

Controversy on microbial standards are discussed keeping in view of the processing diversity from region to region in USA. Moreover the confusion and controversy seemed to centre on six points such as philosophy and definitions, product safety, product quality, sampling procedures, analytical methodology and hormonization among groups with divergent view-point. Paper also discusses current seafood inspection systems. GAR

430 Stefahson (G). Enzymes in the fishing industry. Food Technology 42(3); 1988; 64-65

People in fishing industry are becoming aware the enzymes which-may play an important role in some fields of seafood processing, and already a few applications of enzymes have been commercialised. A few examples of present and potential application are given in this article which deals with removal of skin, removal of membranes and also one enzyme-production. GAR

431 Ward (DR) and Baj (NJ). Factors affecting microbiological quality of seafoods. Food Technology 42(3); 1988; 85-89

This article deals with the effect of inherent basic composition of seafood, handling practices and processes on the microbiological quality. Recommendation on fish vessel sanitation, processing of fishes, use of preservatives and different packaging methods to control microbial degradation is discussed. GAR

Fish

432 Ackman (RG). The year of the fish oils. Chemistry and Industry ; 1988; 139-145

433 Kimura (S), Zhu (X-P), Matsui (R), Shijoh (M) and Takamizawa (S). Characterization of fish muscle type. I. collagen. Journal of Food Science 53(5); 1988; 1315-1318

Muscle type I collagen of five teleosts was characterized with respect to its thermal stability and subunit composition. The muscle collagen exhibited a higher denaturation temp. Td. m solution and a higher degree of proline hydroxylation, compared with skim type I collagen of the resp. sp. Moreover, the Td values seemed to increase with the increasing upper limit of environmental temp. of fish habitats. The subunit composition also varied with fish sp.; an alpha-1, alpha-2, alpha-3 heterotrimer existed in eel and common mackerel and an (alpha 1)$_2$ alpha 2) heterotrimer in saury, while (alpha-1) alpha 2 and alpha-1, alpha-2 and alpha-3 heterotrimers appeared to be major and minor components, resp. in chum salmon and carp. AS

434 Pedrosa-menabrito (A) and Regenstein (JM). Shelf-life extension of fresh fish - A review. Part I. Spoilage of fish. Journal of Food Qual-

ity 11(2); 1988; 117-127

This review covers spoilage of fish due to enzymatic and biochemical changes. Pathogenic bacteria, microbial changes, chemical changes and other deteriorative processes as part of the "extension of shelf-life of fish". NGKR

Anchovies

435 Takiguchi (A). Effects of smoking on lipid oxidation in niboshi and niboshi powder. Bulletin of the Japanese Society of Scientific Fisheries ('Nihon Suisan Gakkai-shi') 54(5); 1988; 869-874

Effect of smoking on the lipid oxidation of niboshi-boiled and dried anchovy **Engraulis japonica** and its powder during drying and storage was investigated. Boiled anchovy was smoked for 30, 60 and 360 min. at 40-60 C and then air dried at 25 C. Total time of smoking of air drying was adjusted to 30 h. During the drying process, peroxide value (POV) of lipids in the samples increased along with decrease in the percentage of the remaining highly unsaturated fatty acids (HUFA), depending on the smoking period. Oxidised acid content of lipids in the samples accepted as good indicators of rusting developed on niboshi, increased during drying. Rate of increase of oxidised acid contents in the non-smoked control and the sample smoked for 30 min was higher than that in the samples smoked for 60 and 360 min. Similar protective effect of smoking to lipid oxidation in niboshi was found during storage. Niboshi powder was also effectively protected from lipid oxidation, by smoking, although the oxidation proceeded faster than in the intact niboshi. These results indicated that smoking for 60 min was effective in protecting lipid oxidation of niboshi during the drying process, storage and at least 360 min smoking was necessary for niboshi powder to protect the lipids from oxidation. SGB

Hakes

436 Beas (VE), Crupkin (M) and Trucoo (RE). Gelling properties of actomyosin from pre- and post-spawning hake (**Merluccius hubbsi**). Journal of Food Science 53(5); 1988; 1322-1326

437 Douglas-Schwarz (M) and Lee (CM). Comparison of the thermostability of red hake and Alaska pollock surimi during processing. Journal of Food Science 53(5); 1988; 1347-1351

Thermostability of red hake (**Urophycis chuss**) mince and its temp.-dependent gel-forming properties were determined while using Alaska pollock (**Theragra chalcogramma**) for comparison. Fish mince and surimi were subjected to various washwater, chopping and setting/cooking temp., cooking times at varying salt concn. and moisture levels. The optimal temp. for washing and chopping were 15 and 12 C for red hake and 10 and 4 C for pollock, resp. All treatments significantly affected gel properties. For red hake gels. 77% moisture, 2.0% salt, and a 40 C preheat-setting temp. produced the most cohesive gel. Gels of both red hake and pollock gradually became less cohesive with extended cooking time. The results suggest that red hake is more thermally stable than pollock. AS

Mackerels

438 Obatake (A) and Kawano (M). Relationship between dark muscle content and body size. **Bulletin of the Japanese Society of Scientific Fisheries ('Nihon Suisan Gakkai-shi')** 54(5); 1988; 885

Menhaden

439 Boye (SW) and Lainer (TC). Effects of heat-stable alkaline protease activity of Atlantic Menhaden (**Brevoorti tyrannus**) on surimi gels. **Journal of Food Science** 53(5); 1988; 1340-1342, 1392

Heat stable protease isolated from the sarcoplasmic fraction of menhaden (**Brevoorti tyrannus**) muscle tissue was characterized as to optimum temp. and pH against casein substrate and its degradative action on actomyosin and surimi during heating. The optimum conditions for activity were 60 C at a pH of 7.5 to 8.0. Activity dropped off remarkably at temp. below 45 C or above 70 C and when pH was below 7.0 above 8.0. The enzyme(s) was capable of degrading actomyosin as observed by sodium dodecyl sulphate electrophoresis. This implicated a causative role for this protease system in the texture degradation observed during thermal processing of menhaden surimi at temp. of 50-70 C. AS

Milkfish

440 Anggawati (AM). Effect of storage methods on keeping quality of milkfish (**Chanos chanos**). **ASEAN Food Journal** 3(2); 1987; 60-65

In this investigation the storage studies on thickfish (**Chanos chanos**) were carried out at 28-32 C partial chilling (4 days at 10 C prior to storage) and iced storage. It was found that the shelflife of milkfish at room temp. was upto 20 whereas the total shelflife of fish partially chilled for 4 days at 10 C and subsequently stored at 28-32 C was 111h. Fish stored in ice was acceptable for upto 20 days there by showing that chilling was a very effective way of reducing fish spoilage in tropical areas. The major microflora in tropical milk fish comprised of mesophiles which could not grow well at 10 C or not grow at all at 0 C whereas the microflora of fish stored at room temp. or partially chilled fish were found to be vibrionaceae and enterobacteriaceae at the time of rejection. NGKR

441 Jiang (S-T), Hwang (D-C) and Chen (C-S). Effect of storage temperatures on the formation of disulphides and denaturation of milkfish actomyosin (**Chanos chanos**). **Journal of Food Science** 53(5); 1988; 1333-1335, 1386

The effects of frozen storage temp. on the formation of disulphides and the denaturation of actomyosin (AM), extracted from milkfish (**Chanos chanos**) dorsal muscle, were investigated. The activities of Ca-ATPase and Mg(Ca)-ATPase, Ca-sensitivity and AM solubility in 0.6 M KCl decreased at a higher rate at -20 C than at -35 C. The total NaBH soluble and insoluble proteins increased at a much higher rate at -20 C than at -35 C. During the freezing process, the total SHs decreased significantly; the total SHs decreased with a faster note at -20 C than at -35 C, suggesting that more disulphides formed in samples at -20 C than at -35 C. During storage, disulphides formed at -20 C but not at -35 C. AS

442 Jiang (S-T), Hwang (D-C) and Chen (C-S). Denaturation and change in SH groups of actomyosin from milkfish (**Chanos chanos**) during storage at -20 C. **Journal of Agricultural and Food Chemistry** 36(3); 1988; 433-437

The formation of disulphides, effects of the addition of reductants before freezing, and denaturation of milkfish (**Chanos chanos**) actomyosin (AM) during storage at -20 C were investigated. In the freezing process, aggregation-denaturation was mainly caused by the formation of hydrogen, hydrophobic, and disulphide bonds; during storage, more disulphides formed. The addition of sodium nitrite and before freezing accelerated the denaturation of AM during storage. However, when added to freeze-denaturated AM, sodium nitrite and recovered AM's solubility in 0.6 M KCl and the total SHs and decreased the sum of NaBH soluble and insoluble fractions. These data suggested that the formation of disulphides affected the denaturation of AM during freezing and frozen storage. AS

Mullets

443 English (PM), Gerdes (DL), Finerty (MW) and Grodner (RM). Effects of tripolyphosphate dips on the quality of thermally processed mullet (**Mugil cephalus**). **Journal of Food Science** 53(5); 1988; 1319-1321, 1502

The feasibility of thermal processing of fresh and frozen mullet was investigated. The average time to reach 12D process at 121 C (15 psi) was 54 min. Various pre-can tripolyphosphate treatments were used to improve final product quality. Most changes in Hunter colour difference values due to treatment or to storage period were insignificant. Pretreatment with sodium tripolyphosphate (0.07-0.19% phosphorus pentoxide) significantly improved texture ($P < 0.005$) of the canned product as measured by an Instron Texture Analyzer equipped with Kramer Shear Cell. Sensory panel texture scores correlated well with Instron Shear values. Panelists could distinguish between treatments and treatment levels. AS

Snapper

444 Fletcher (GC) and Hodgson (JA). Shelf-life of sterile snapper (**Chrysophrys auratus**). **Journal of Food Science** 53(5); 1988; 1327-1332

The deterioration of snapper (**Chrysophrys auratus**) held at 0 C in the presence or absence of bacteria was studied using frozen fillets held at -30 C as a reference. Chilled snapper with or without bacteria lost the characteristics of fresh snapper by 9 days and developed unpleasant odours and flavours by 15 days storage. Over this period the sterile portions were never of a better quality than those undergoing normal **microbial** spoilage. Regression equations for predicting fish **quality** from the levels of nucleotide catabolites were considered. AS

Tilapia

445 Park (JW) and Lainer (TC). Calorimetric changes during development of rigor mortis. **Journal of Food Science** 53(5); 1988; 1312-1314, 1372

Postmortem thermal behaviour of tilapia dorsal muscle was investigated by differential scanning calorimetry (DSC) and postmortem biochemical changes were determined by pH and ATP/IMP ratio. A large exothermic DSC peak near 50 C, observed soon after sacrificing, was the most striking difference between thermograms of pre-rigor muscle compared to that of post-rigor muscle. This exothermic peak was attributed to ATP hydrolysis based on the observed effects of added ATP, EGTA and calcium chloride. AS

Trouts

446 Surowka (MFK) and Leszczynska-Fik (A). Application of superchilling to prolong the keeping time of rainbow trout. **Nahrung** 32(3); 1988; 291-300

Deals with refrigeration at peri-cryoscopic temp. as a measure to preserve rainbow trout. Effects of superchilling and storage at -2 C on sensory, physico-chemical, and microbiological changes in rainbow trout are analysed. BV

Trumpeter

447 Fletcher (GC) and Statham (JA). Deterioration of sterile chill-stored and frozen trumpeter fish (**Latridopsis forsteri**). Journal of Food Science 53(5); 1988; 1336-1339

The rate of nonmicrobial deterioration in the flesh of bastard trumpeter (**Latridopsis forsteri**) was studied. Sterile flesh became unacceptable within 7 days at 4 C, due to nonmicrobial deterioration. The rate of nucleotide catabolism was sufficiently rapid to contribute significantly toward the decrease in acceptability of this species during chill-storage. Deterioration was slow at -7 C, and little change occurred at -18 C. It was demonstrated that the biochemical characteristics of the flesh were as important to spoilage as the microbiology of the product. Temp. abuse must be avoided to ensure max. possible shelf-life. AS

Molluscs

Crabs

448 Yoon (IH), Matches (JR) and Rasco (B). Microbiological and chemical changes of surimi-based imitation crab during storage. Journal of Food **Science** 53(5); 1988; 1343-1346, 1426

Changes in surimi-based imitation crab products were monitored during storage at 0, 5, 10 and 15 C. Numbers of bacteria growing on crablegs and flaked crablegs during 42 days storage were measured. The genera making up the major portion of these population were **Bacillus** sp. at 15 C and Pseudomonas at 5 C and 0 C. Chemical changes in the products produced by bacteria were mointored. Levels of total volatile bases produced were lower in the imitation crab than those reported for fresh fisheries products. The major compounds produced in crableg analogs were volatile acids and butandiol, which increased as the storage time increased. AS

Squids

449 Nietisewojo (P). Effect of forzen storage on the texture of squid (Loligo sp.) mantle. **ASEAN Food Journal** 3(2); 1987; 72-73

Products

Kamaboko

450 Akahane (Y), Fujino (M) and Shimizu (Y). Release of water from packed Kamaboko. **Bulletin of the Japanese Society of Scientific Fisheries ('Nihon Suisan Gakkai-shi')** 54(5); 1988; 823-828 (Ja).

Kamaboko from the frozen Kaen-surimi of Alaska pollock was prepared in three froms viz, casing, stuffed, vacuum packed, and non-vacuum packed. The existence of three different states of water in Kamaboko was suggested by the Henderson's water sorption isotherm analysis. Mono-molecular water layer was estimated by the B.E.T. equation. Three types of water (I, II and III), differing in mobility were recognised by thermogravimetry. Water classified into the state I, which was regarded as free water was the most abundant of the three. Most of the water added to surimi in the processing of Kamaboko was in state I. Released water on the surface and the cut surface of the cross sections of casing stuffed Kamaboko was determined. Little water released on the surface of Kamaboko in contact with the casing; some water in state I existed on the cross cut surface of slices and this was released in proportion of the cross sectional area. The released water on the cross cut surface of slices increased slightly during storage, in the case of non-vacuum packed samples, while it remarkably increased in the case of vacuum packed samples. The water release from vacuum packed Kamaboko may be due to the capillary action. SGB

451 Niwa (E), Wang (T-T), Kanoh (S) and Nakayama (T). Strengthening effect of the various natural high polymers on the elasticity of the Kamaboko. **Bulletin of the Japanese Society of Scientific Fisheries ('Nihon Suisan Gakkai-shi')** 54(5); 1988; 841-844

In order to compare the strengthening effect of various high polymers on the elasticity of the Kamaboko from Alaska pollock frozen surimi, the textural parameters of the Kamaboko added with each of them were measured. The high polymers examined were as follows; 1) agar powder, 2) K-carrageenan, 3) cellulose powder, 4) chitin from crab shells, 5) corn starch, 6) egg albumin, 7) gelatin powder, 8) lignin, 9) methyl cellulose, 10, 11) isolated soybean proteins A1 and A2 and 12) wheat gluten, where the soybean protein A2 was the heat-denatured product of the soybean protein A1. The textural parameters were determined by the dynamic visco-elasticity test, punctual test and expressible water test. The relatively effective high polymers were 1, 2, 5, 6, 10, 11 and 12. AS

PROTEIN FOODS

Infant foods

452 Marero (LM), Payumo (EM), Aguinaldo (AR) and Homma (S). Nutritional characteristics of weaning foods prepared from germinated cereals and legumes. **Journal of Food Science** 53(5); 1988; 1399-1402

Acceptable and microbiologically safe weaning food formulations prepared from 70:30 combination of germinated rice:mungbean, germinated rice:cowpea, germinated corn:mungbean, and germinated corn:cowpea were nutritionally evaluated. Germination reduced the dietary bulk of the formulations due to decrease in viscosity of gruels, hence increasing their nutrient density. All blends had amino acid values that approx. the FAO reference pattern, except for the S-containing amino acids. The rice-based formulations were found superior to the corn-based ones based on the chemical score for cystine/methionine, net dietary protein energy and protein efficiency ratio. Germination increased the micronutrient contents of the formulations except for calcium. AS

453 Marero (LM), Payumo (EM), Librando (EC), Lainez (WN), Gopez (MD) and Homma (S). Technology of weaning food formulations prepared from germinated cereals and legumes. **Journal of Food Science** 53(5); 1988; 1391-1398

The use of germinated cereals and legumes in reducing bulk of weaning foods was investigated. The blends were formulated and studied for their viscosity, acceptability, and quality. Germinated rice-mungbean, germinated rice-cowpea, germinated corn-mungbean and germinated corn-cowpea (germination period was 72 h for rice/corn and 48 h for mungbean/cowpea) indicated viscosity reduction from about 20,000 cps to about 3000 cps at the 70:30 ratio with concomitant good scores in general acceptability. About 400 mL gruel prepared from the formulations met 1/3 RDA for protein and energy requirements of infants. The products were found stable for 6 months, microbially safe, and well-tolerated by the infants. AS

454 Venkata Rao (S), Hariharan (K), Kurien (S), Daniel (VA), Narayanaswamy (D), Murti (IAS), Rajalakshmi (D), Amla (I), Karan (S) and Abraham (S). Effect of feeding formulae containing two levels of milk protein on the growth and immunological status of infants. **Arogya** 14(2); 1988;

115-122

In an initial exp., three groups of infants numbering 20-25 per group were fed three isocaloric formulae containing 22% and 12% protein with or without supplementation of methionine. There were no significant differences in wt. gain, increase in length, head and chest circumferences and in hemoglobin, total protein and albumin contents in blood, between the three groups of infants when fed on the respective formulae for 6 months. In a second exp. also, in which two groups of infants were fed on the 22% or 12% protein formulae, no significant differences were observed in various immunological parameters such as the levels of T and B lymphocytes, H-thymidine uptake of lymphocytes following PHA stimulation, serum immunoglobule in levels (between 13-19 infant per group) and bactericidal activity of leucocytes (in infants numbering 7-8 per group) when the two groups of infants wer fed for 6 months on the two formulae. A higher retention of nitrogen and higher valine and leucine levels in blood were observed in infants of both sexes numbering 9-10 per group fed formula containing 22% proteins compared with those fed 12% protein formula. Otherwise, no significant differences were observed between the two groups of infants, in blood levels of various essential amino acids (in 9-10 infants of both sexes in each groups), urinary excretion of cretinine and hydroxyproline (in 5-6 babies in each group) and in calcium and phosphorus retentions (among 9-10 babies in each group). The data indicated that the protein content of commercial infant formulae can be safely reduced from 22% to 12%. AS

ALCOHOLIC AND NON-ALCOHOLIC BEVERAGES

Alcoholic beverages

455 Cleg (BS) and Frank (R). Detection and quantitation of trace levels of ethyl carbamate in alcoholic beverages by selected ion monitoring. **Journal of Agricultural and Food Chemistry** 36(3); 1988; 502-505

Ethyl carbamate (urethane), a known carcinogen, has been identified in various fermented beverages and distilled products of Ontario. A specific, sensitive gas chromatographic procedure is described for the detn. of ethyl carbamate in alcoholic beverages. Initially samples are pretreated with sodium chloride and then the ethyl carbamate is extracted with dichloromethane and the solvent evaporated to incipient dryness. The residue is then redissolved in methanol or ethyl acetate followed by examination without cleanup by capillary gas chromatography using an ion trap detector (ITD). The method proved to be suitable for the detn. of trace levels of ethyl carbamate in various matrices. Recoveries were better than 80% in all products analyzed at fortification levels ranging from 10 to 400 μ g L . AS

456 Swanstor (J-S) and Taylor (K). A comparison of some rapid tests to assess extent of modification during a laboratory scale malting procedure. **Journal of the Institute of Brewing** 94(5); 1988; 311-314

Three cvs of barley (Triumph, Golden promise and Korm) were subjected to malting simultaneously and their malt modification were assessed by; hot water extract Alpha-amylase activity by nephelometric technique and by measurement of malt milling energy, on progressive germination. There was a positive correlationship among the various parameters studied however, the malt milling energy technique provided the most rapid and easy method of assessment of endosperm modification. NGM

Beer

457 Baker (CD). Determination of dimethyl sulphide in beer by gas chromatography. Journal of the Institute of Brewing 94(5); 1988; 325-326

The analysis of dimethyl sulphide by the routine headspace gas chromatographic method, and standardized flame photometric and flame ionisation detector method was conducted by a collaborating study. The mean repeatability value (R_{95}) was 7.8 µ g/l for the concn range 12-65 µ g/l, and the reproducibility value (R_{95}) showed the relationship R_{95} = 18.1 + 0.452 m µ g/l to the concn (m). The study indicated that the routine headspace gas chromatographic method is a suitable method for dimethyl sulphide in beer. NGM

458 Sharpe (FR). Assesment and control of beer flavour. Journal of the Institute of Brewing 94(5); 1988; 301-305

The three main flavour assessment techniques viz., the triangle test, flavour profile and Frueners to-type testing followed in breweries for quality control and in development of new beer products are described. The control of beer flavour in a model system by the use of CGMS and sensory quality attributes which could be followed in quality control aspects of beer are illustrated. NGM

Sorghum beer

459 Trinder (DW). A survey of aflatoxins in industrially brewed South African sorghum beer and beer stainings. Journal of the Institute of Brewing 94(5); 1988; 307-309

Over a five yr period, 150 samples of sorghum beer and 211 samples of spent grains of South African breweries were tested for their aflatoxin content. The analysis was done for beer samples concentrated under reduced pressure. The chloroform extracts of concentrated beer and the strainings were subjected for aflatoxin estimation by column chromatography followed by two dimensional TLC. The aflatoxin (B_1) content of beer in 97% of the sample was below 0.1 µ g/kg and the 3% contained about 0.1 µ g/kg, where as the straining contained less than 0.5 µ g/kg. These levels are well within the regulatory max. levels permitted. NGM

Wines

460 Enkelmann (R). Migration of heavy metals from bentonites to wine. Deutsche Lebensmittel-Rundschau 84(8); 1988; 243-247 (De).

461 Romero (LI), Sales (D), Cantero (D) and Galan (MA). Thermophilic anaerobic digestion of winery waste (Vinasses). Kinetics and process optimization. Process Biochemistry 23(4); 1988; 119-125

Vinasses from wine-distilleries has a high organic contaminant load (16-25g COD^{1}) an acidic character (pH about 3.8), and are discharged at almost 90 C. This paper examines the viability of the thermophilic anaerobic process as an alternative to mesophilic process for the reduction of waste strength. Start-up and acclimatisation of the digesters until attainment of steady-state conditions, and kinetic studies for the thermophilic anaerobic process to achieve an optimum purifying performance were realized. Substrate utilization and methane production models, both proposed by Chen and Hashimoto, predicted accurately the performance of the process and may be used in the design of treatment units. Once optimum operating conditions had been attained (at four days retention time and 4.25 kg COD m^{-1} C day load density) COD removal of 88% and 0.25 m^{3} methane kg^{-1} COD added were achieved. AS

Non-alcoholic beverages

462 Singh (T) and Bains (GS). Grain extract-milk beverages. Processing and physico-chemical characteristics. Journal of Food Science 53(5); 1988; 1387-1390

Extracts from germinated barley, wheat, triticale, and corn showed compatibility when blended with milk in proportions of 30%, 40%, and 50% resp. The pH of grain extract-milk blends initially adjusted to 7.2 decreased to pH 6.2-6.4 when processed in bottles at 12 C for 15 min. The wheat and barley extract beverages scored highest preference followed by triticale and corn beverages. The beverage has excellent malty taste and smooth mouth feel. AS

463 Teh (LS) and Francis (FJ). Stability of anthocyanins from **Zebrina pendula** and Ipomoea tricolor in a model beverage. Journal of Food Science 53(5); 1988; 1580-1581

Anthocyanins from two sources with reported high stability, Ipomoea tricolor and **Zebrina pendula**, were compared with extracts from blackberries containing mainly cyanidin 3-glucoside (Cn-3-G) and a commercial enocyanin. The pigment samples were fromulated in sugar, citrate-phosphate buffer solution for storage at room temp. Tristimulus colour data and pigment retention were measured at periods up to 82 wk. The Ipomoea pigments were the most stable. Zebrina and Cn-3-G samples were similar followed by enocyanin. Deacylated pigments from both **Ipomoea** and **Zebrina** were the least stable indicating that the acyl groups conferred stability. AS

Cocoa

464 Sanchez (JE), Guiraud (J-P) and Galzy (P). Research into yeast able to ferment cocoa by the three phase process. Cafe-Cacao-The 32(2); 1988; 141-148 (Fr).

Coffee

465 Guyot (B), Petnga (E) and Vincent (JC). Qualitative analysis of a Coffea canephora var. robusta according to ripeness. Part I. Changes in the physical, chemical and organoleptic characteristics. Cafe-Cacao-The 32(2); 1988; 127-139 (Fr).

466 Tsubouchi (H), Terada (H), Yamamoto (K), Hisada (K) and Sakabe (Y). Ochratoxin A found in commercial roast coffee. Journal of Agricultural and Food Chemistry 36(3); 1988; 540-542

467 Wurzner (HP). Action of coffee on human performance. Cafe-Cacao-The 32(1); 1988; 49-55 (Fr).

The understanding of mechanism of cellular and tissue function as influenced by coffee and caffeine suggest that the effects are modulated via multiple and complex mechanisms for variety of functions in the brain, muscles and a number of other organs and tissues. BV

Fruit juices

Grape juices

468 King (RC), Sims (CA), Moore (LF) and Bates (RP). Effects of maturity, skin contact and carbonation on the quality of sterile filtered white muscadine grape juice. Journal of Food Science 53(5); 1988; 1474-1476

The effects of grape maturity, skin contact and carbonation on the quality of sterile-filtered muscadine grape juice were investigated. A sensory panel preferred the late maturity juices that had a higher degree of muscadine character and lower total phenolics. Tartaric and malic acid levels decreased with increasing maturity with malic acid decreasing to a greater extent. A 24 h skin contact at 2 C had no significant effect on sensory results, but increased colour intensity, phenolic and organic acid levels as compared to immediate pressing. Carbonated juices were lighter as in colour and were preferred equally to non-carbonated juices. Juices obtained from a hard pressing regime had slightly higher levels of organic acids than free run juice at the early harvest only. AS

Orange juices

469 Crandall (PG), Davis (KC), Carter (RD) and Sadler (GD). Viscosity reduction by homogenization or orange juice concentrate in a pilot plant taste evaporator. Journal of Food Science 53(5); 1988; 1477-1481

Controlling viscosity is critical to efficient evaporation and pumping of citrus conc. Viscosity was reduced by a commercial homogenizer installed between the third and fourth stage of a pilot plant taste evaporator. Juice was concentrated to 65 Brix with and without homogenization. The results showed at 13% decrease in viscosity due to homogenization. Mean non-homogenized values were 279 mPa.s (s.d. = 7.5) on the 65 Brix control and 242 mPa.s (s.d. = 10) on the homogenized concn., both measured at 350 sec^{1} which was calculated to be the shear rate for these samples within the third stage of this evaporator. This decrease in viscosity also reduced the energy consumption about 3 to 4% or produced a higher (2 to 3) Brix conc. Homogenization did not significantly affect the juice colour, acid, pulp or vitamin C. **AS**

470 Kannane (A), Kane (D) and Labuza (TP). Time and temperature effect on stability of Moroccan processed orange juice during storage. **Journal of Food Science** 53(5); 1988; 1470-1473, 1489

The loss of quality of processed pasteurized orange juice stored at 4, 22.5, 35 and 45 C for up to 14 wks was evaluated. The results showed that parameters such as pH, total solids, titratable acidity, formol index, and total sugars did not significantly change during storage at all temp. However, a major change was observed for ascorbic acid content, reducing sugars and furfural production, except for storage temp. at 4 C. Ascorbic acid degradation, sucrose hydrolysis, and furfural build-up followed pseudo-zero order reaction kinetics. The minimal change of formol number and total sugars suggested that non-enzymatic browning was mainly due to ascrobic acid degradation. Furfural formation during storage was found to be much higher than that reported in the literature. **AS**

Tea

471 Klein (S). Tea-production, composition and reactions. **Ernahrungsforschung** 32(4); 1987; 120-122 (De).

Describes availability of tea (**Thea sinensis** and **Thea assamica**) as the fermented, unfermented or partially fermented product; quality of tea as influenced by age and size of tea leaves and its content c caffeine, tannins, essential oils and minerals. Effect of tea on human metabolism and nervous system is discussed. BV

FATS AND OILS

Fats

472 Sundar Rao (K) and Lakshminarayana (G). Lipid class and fatty acid compositions of edible tissues of **Peucedanum graveolens, Mentha arvensis**, and Colocasia esculenta plants. **Journal of Agricultural and Food Chemistry** 36(3); 1988; 475-478

Lipids were isolated from the young edible tissues of plants, namely leaves and stems of **Peucedanum graveolens** syn. **Anethum graveolens** syn. **Anethum sowa** (dill) and **Mentha arvensis** (field mint, corn mint, labiata) and leaves and leaf stalks of **Colocasia esculenta** syn. **Colocasia antiquorum** (taro, elephant ears, dasheen, eddo, cocoyam). The lipid contents of dry-wt. basis were 7.1 and 2.4% in the leaves and stems of **P. graveolens** 6.2 and 2.0% in the leaves and stems of **M. arvensis**, and 9.7 and 3.5% in the leaves and leaf stalks of **C. esculenta**, resp. Lipid classes were separated by silicic acid column chromatography and thin-layer chromatography was estimated. Among the nonpolar lipids, pigments were the major components. Monogalactosyl diglycerides and digalactosyl diglycerides were the chief constituents of glycolipids. Phosphatidylcholine was the predominant phospholipid in all except for phosphatidylglycerol in the **P. graveolens** leaves. Among the constituent fatty acids, determined by gas-liquid chromatography, the major ones were linolenic (18:3) and palmitic (16:0) in the leaves and linoleic (18:2) and palmitic in the other tissues. AS

Fatty acids

473 Shimizu (S), Kawashima (H), Shinmen (Y), **Akimoto** (K) and Yamata (H). Production of eicosapentaenoic acid by **Mortierella** fungi. Journal of **the American** Oil Chemists" **Society** 65(9); 1988; 1455-1459

Mycelia of arachidonic acid producing fungi belonging to the genus **Mortierella** were found to be rich sources of 5, 8, 11, 14, 17 - cis-eicosapentaenic acid (EPA). EPA comprised 5-20% of the total extractable mycelial fatty acids in most strains tested. Other major fatty acids in the lipids were palmitic (6.0%), stearic (5.3), oleic (6.2), linoleic (3.0), Gamma-linoleic (3.5) and arachidonic acid (60.0). MNK

Oils

474 Wijesundera (RC), Ackman (RG), Abraham (V) and de Man (JM). Determination of sulphur contents of vegetable and marine oils by ion chromatography and indirect ultraviolet photometry of their combustion products. Journal of the **American** Oil Chemists" **Society** 65(9); 1988; 1526-1530

A simple method for the detn. of total sulphur content in vegetable and marine oils is described. The method involves combustion of the oil sample in an oxygen bomb to convert all forms of sulphur to sulphate ions with subsequent detn. of the sulphate by ion chromatography and indirect ultraviolet detection. The ultraviolet system described is more sensitive than conductivity detection and enables the method to be applied more widely. Application of the method to a var. of vegetable and marine oils showed the general occurrence of sulphur in fats and oils, albeit often at a low level. Among the samples examined, crude Canola oil had the highest sulphur content (25.0 mg/kg) followed by the marine oils (5.8 -15.2 mg/kg) and the non-Cruciferae vegetable oils (2.0-6.1 mg/kg). AS

Cottonseed oils

475 Attia (M), Taha (FS), Mustafa (HM) and El-Nockrashy (AS). Bench-scale treatments of colour fixed cottonseed oil. **Nahrung** 32(3); 1988; 281-

284

Bench-scale refining of crude colour fixed cottonseed oil was carried out using equipment and conditions similar to those at a local factory. Ethanolamine at 2-3% level resulted in 55-62% reduction in the oil colour, and 24-26% reduction in the refining loss over the factory treated oil. Sodium silicate at 0.14-0.47% level resulted in about 50% reduction in oil colour and 24-44% reduction in the refining loss. A two-step treatment, first with caustic soda lye then with either additives, and miscella refining using ethanolamine as an additive, resulted in superior oil colour, yet the refining losses were high. AS

476 Park (SW) and Rhee (KC). A capillary GC determination of cyclopropenoid fatty acids in cottonseed oils. Journal of Food Science 53(5); 1988; 1497-1502

A capillary gas chromatography (GC) method was studied for direct analysis for cyclopropenoid fatty acids (CPEFAs) as methyl esters. No thermal alterations were indicated in CPEFA methyl esters on a Supelcowax 10 or a DB-5 capillary column like other fatty acid methyl esters (FAMEs), which obviated a second derivatization. GC conditions are described for a complete separation and quantitation of CPEFAs in cottonseed oils. CPEFAs of cottonseed oils from various refining steps were analyzed by the method. The reliability of the method was demonstrated with over 95% recoveries of CPEFA methyl esters diluted in corn oil FAMEs at various levels as low as 0.017%. AS

Essential oils

477 Lawrence (BM). Progress in essential oils. **Perfumer & Flavorist** 13(1); 1988; 44-50

Covers amyri oil, deertonge extract, Eucalyptus citriodora oil; savory oil; Spanish sage oil and tarragon oil. BV

478 Simon (JE) and quinn (J). Characterization of essential oil of parsley. Journal of Agricultural and Food Chemistry 36(3); 1988; 467-472

A germplasm collection of parsley (Petroselinum crispum), consisting of 104 accessions from the USDA Plant Introduction Station including curly and flat leaf and Hamburg types, was greenhouse grown and the essential oil extracted from fresh leaves by water distillation and analyzed by GC and GC/MS for essential oil content and composition. The essential oil content ranged from 0.00 to 0.16% (v/fresh wt.), and the constituents include Alpha-pinene, Beta-pinene, myrcene, Alpha-phellandrene, Beta-phellandrene, terpinene, terpinolene and 1-methyl-4-isopropenylbenzene, 1, 3, 8 -p-methatriene, thymol, myristicin, apiol, plus three unknowns, two of mol. wt. 168 and one of 268. Individual accessions varied greatly in essential oil composition. In general the major constituent was 1, 3, 8-p-menthatriene, followed by Beta-phellandrene, myristicin, and myrcene. Parsley accessions high in the specific constituents (as a percent of essential oil) 1, 3, 8-p-methatriene (68%), myristicin (60%), Alpha-phellandrene (33%), apiol (22%), myrcene (16%), terpinolene and 1-methyl-4-isopropenylbenzene (13%), and MW 268 dimer (10%) were identified. Thymol was detected in seven accessions, as 2% or less, and this is the first report of this compound in parsley leaf oil. AS

Rapeseed oils

479 Leszkiewicz (B) and Kasperek (M). The effect of heat treatment on fatty acids .of rapeseed oils. **Journal of the American Oil Chemists" Society** 65(9); 1988; 1511-1515

Changes were followed in raw, refined and hydrogenated rapeseed oils subjected to an eight h heating under isothermal conditions within 110-200 C. The oils underwent oxidation, polymerization and changes in unsaturation, the extent of the above changes depending essentially on the kind of oil and the temp. applied. AS

480 Thomas (KC), Magnuson (B) and McCurdy (AR). Enzymatic interesterification of Canola oil. **Canadian Institute of Food Science and Technology Journal** 21(2); 1988; 167-173

The effectiveness of commercially available lipases and the reaction conditions for the modification of canola oil by interesterification were studied. Mixtures of canola oil and lauric acid and trilaurin and canola oil and fully hydrogenated high erucic acid rapeseed oil (HEAR stearin) were examined for changes in triacylglycerol composition and physical properties. MVG

Soybean oils

481 Madrigal (RV), Bagby (MO) and Pryde (EH). The acid-catalyzed addition of alkoxyl groups to the olefinic double bonds of soybean oil. **Journal of the American Oil Chemists" Society** 65(9); 1988; 1508-1510

The acid-catalyzed reaction of soybean oil with the homologous series of straight-chain alcohols: methyl, ethyl, n-propyl, n-butyl and n-hexyl in a pressurized system yielded completely trans esterified products and 18-31% substituted alkyl ethers. Mass spectrometry of the hydrogenated methyl ester derivatives showed that the addition reaction occurred at one of three double bonds of the unsaturated fatty acids. The reaction with three secondary alcohols yielded only 0.1-2.5% substituted alkyl ethers. AS

SPICES AND CONDIMENTS

482 Marangoni (A), Alli (I) and Kermasha (S). Composition and properties of seeds of the tree legume Tamarindus indica. **Journal of Food Science** 53(5); 1988; 1452-1455

Spices

Cumin

483 Hemavathi (J) and Prabhakar (JV). Lipid composition of cumin (**Cuminum cyminum L.**) seeds. **Journal of Food Science** 53(5); 1988; 1578-1579

Total lipids extracted from cumin (**Cuminum cyminum L.**, Umbelliferae) amounted to 14.5% of the dry seeds. The total lipids consisted of 84.8% neutral lipids, 10.1% glycolipids, and 5.1% phospholipids. Neutral lipids consisted mostly of triacylglycerols (89.4%) and small amounts of diacylglycerols, free fatty acids, sterols, sterolesters, and hydrocarbons. At least five glycolipids and five phospholipids were identified. Acylomonogalactosyl diacylglycerol and acylatedsteryl glucoside were the major glycolipids, while monogalactosyl diacylglycerol, monogalactosyl monoacyglycerol, and digalactosyl diacylglycerol were present in small quantities. Phosphtidylethanolamine and phosphatidylcholine were the major phospholipids, while phosphatidylinositol, lysophosphatidylethanolamine, and phosphatidylglycerol were present in small amounts. The fatty acid composition of these different neutral lipids, glycolipids, and phospholipids were determined. AS

Ginger

484 Paull (RE), Chen (NJ) and Goo (TTC). Control of weight loss and sprouting of ginger rhizome in storage. **HortScience** 23(4); 1988; 734-736

Maleic hydrazide (MH) and isopropyl-n-(3-chlorophenyl) carbamate (CIPC) waxing gamma irradiation treatments were used to inhibit sprouting and wt. loss in ginger rhizome stored at 22 C and at 70% R.H. of the above treatments CIPC was effective to reduce the sprout lengths and maleic hydrazide is only next to CIPC as inhibitor. Gamma-irradiation at 25 to 50 Gy (Grays) dosage, if the rhizomes are to be stored less than 3 months and 500 Gy (Grays) dosage is required if the rhizomes are to be stored for more than 3 months at 22 C. Of all the treatments gamma-irradiation treatment was found more effective. BAP

Ginger oil

485 Chen (C-C) and Ho (C-T). Gas chromatographic analysis of volatile components of ginger oil **Zingiber officinale Roscoe** extracted with liquid carbon dioxide. **Journal of Agricultural and Food Chemistry** 36(2); 1988; 322-328

Freeze-dried ginger powder was extracted with liquid carbon dioxide (600-700 psi) for 48 h. Volatile components in the oily extract were fractionated into one hydrocarbon fraction and two oxygenated hydrocarbon fractions by using silica gel column chromatography. Each fraction was analyzed by capillary GC and GC-MS. Out of 168 characterized compounds 90 were identified as far as possible by comparing GC retentions and mass spectral data. There were 58 tentatively identified compounds according to mass spectral data. Effects of liquid carbon dioxide extraction upon the volatile composition of ginger were discussed. AS

Pepper

486 Mejia (LA), Hudson (E), Gonzalez De Mejia (E) and Vazquez (F). Carotenoid content and vitamin A activity of some common cvs of Mexican peppers (**Capsicum annuum**) as determined by HPLC. **Journal of Food Science** 53(5); 1988; 1448-1451

Alpha-, beta-, and gamma- carotenes, beta-cryptoxanthin and total vitamin A activity in five different immature cvs of peppers (**Capsicum annuum**), commonly consumed in the Northwest region of Mexico, were determined by high performance liquid chromatography (HPLC). Among the cvs studied, "Poblano" pepper had the highest provitamin A (111.4 plus or minus 28.2 u g Retinol Equivalents (RE)/100g) followed by "Serrano" (86.7 plus or minus 13.0), "Jalapeno"(67.0 plus or minus 8.7), "Verde" (30.2 plus or minus 3.0), and Caribe" (2.2 plus or minus 0.9). In general, these values were higher than the vitamin A of pepper reported by the Mexican food composition tables and lower than the data presented in the INCAP/ICNND food composition tables for use in Latin America. AS

SENSORY EVALUATION

Nil

FOOD STORAGE

Nil

INFESTATION CONTROL AND PESTICIDES

Nil

BIOCHEMISTRY AND NUTRITION

Biochemistry

487 Aust (L), Schliemann (H), Proll (J) and Mieth (G). Oxidation and accumulation of sucrose polyesters after i.v. application in rats. **Nahrung** 32(3); 1988; 305-307

Polyester of sucrose and longchain fatty acids (SPE) are prototypes of unabsorbable compounds with fat like physico-chemical properties. Their application leads to an increase of fecal cholesterol excretion, which is accompanied by a significant stimulation of the cholesterol synthesis in the liver and partly by a reduction of the lipid level in serum. SPE are consequently potential substitutes for dietary fats in foodstuffs to reduce energy intake and the serum lipid level. Earlier animal experiments with 6% C-labelled sucrose-octa palmitate in a semisynthetic diet, however, outlined a very small but not neglectable accumulation rate of $10^{-3} - 10^{-5}$% in various organs after a feeding time of 7 days or 3 and 6 wks. resp. Because nothing is known about metabolic fate of incorporated SPE the study aimed at the elucidation of the metabolic behaviour of SPE after i.v. injection to mimic a higher accumulation rate. AS

488 Candlish (JR), Gourley (L) and Lee (HP). Dietary fibre and starch in some Southeast Asian Foods. **ASEAN Food Journal** 3(2); 1987; 81-82

489 Greger (JL). Calcium bioavailability. **Cereal Foods World** 33(9); 1988; 796-800

This feature article deals with methodology for assessment of Ca bioavailability, comparison of Ca bioavailability from supplements and foods, and dietary factors affecting the Ca bioavailability. The bioavailability of Ca was found to depend on the composition of diets in terms of level of Ca, proteins, phosphorus, Mg, fiber, phytate, fat, lactose, sugars and vitamin D. PHR

490 Li (BW) and Andrews (KW). Simplified methods for determination of total dietary fiber in foods. **Journal of the Association of Official Analytical Chemists** 71(5); 1988; 1063-1064

491 Ministry (AN), Brittin (HC) and Stoecker (BJ). Availability of iron from food cooked in an iron utensil determined by an in vitro method. **Journal of Food Science** 53(5); 1988; 1546-1548, 1573

Availability of iron from food cooked in iron utensils was determined by an in vitro method. Foods were cooked in iron (I) and in noniron (NI) utensils and combined to form meals. Apple sauce and the meal contained more iron when cooked in I than in NI. The meals were subjected to simulated gastrointenstinal digestion. Iron from the digestion mixture which diffused across a semipermeable membrane was measured colorimetrically and by radioassay. Treatment (cooked I vs NI) did not affect dialyzable iron. The radioassay showed higher dialyzable iron than the colorimetric method. Iron added to food by cooking in iron utensils was as available (as indicated by dialysis) as native food iron. AS

492 Niewoehner (C). Calcium and Osteoporosis. **Cereal Foods World** 33(9); 1988; 784-787

This feature article deals with human bone structure osteoporosis and osteoporotic fractures, estrogen replacement, nutritional therapy, Ca supplementation and Ca rich foods, bioavailability of Ca and effect of Ca on the bone mass. Increased Ca ingesion alone has not been sufficient to prevent loss of bone mass. Hence Ca should be considered as a useful adjunct to other measures and may be particularly useful for the prevention of type II osteoporosis. PHR

493 Smith (KT). Calcium and trace mineral interactions. Cereal Foods World 33(9); 1988; 776-781

This feature article deals with interrelationship of Ca with trace minerals particularly Zn and Fe. This is of relevance in supplementation and fortification of foods. Favourable and detrimental effects of these nutritional interactions are considered in this article. PHR

494 Weaver (CM). Calcium and hypertension. **Cereal Foods World** 33(9); 1988; 792-794

This feature article deals with the importance of Ca in the diet in maintaining the normal blood pressure in human beings. However its mechanism of action has yet to be established. PHR.

Amino acids

Lysine

495 Chiang (GH). High-performance liquid chromatographic determination of Epsilon-pyrrole-lysine in processed food. Journal of Agricultural and Food Chemistry 36(3); 1988; 506-509

Epsilon-Pyrrole-lysine-a glucose-lysine Amadori compound-has been identified in the water-soluble fraction of many processed foods by an isocratic HPLC methoa. The method employed a C8 reversed-phase column, a 0.5% NaOAc buffer (pH 4.3) mobile phase, and an electrochemical (EC) detector. Epsilon-Pyrrole-lysine was found to be highly electroactive. With EC detection, as little as 0.5 p.p.m. of Epsilon-Pyrrole-lysine was detected. The method was applied to various storage samples such as nondairy creamer, dry dog food, instant gravy, powdered meal replacer dry milk, hot cocoa mix, snack bars, and semi-moist sauce. The measured Epsilon-pyrrole-lysine level in each product reflected shelflife and storage conditions closely. Moreover, Epsilon-pyrrole-lysine level maintained its upward trend even under severe heat treatment (at 110 C) and suggested that it may serve as an indicator of the "advanced" Maillard reaction. AS

Proteins

496 Kitabatake (N) and Doi (E). Surface tension and foamability of protein and surfactant solutions. **Journal of Food Science** 53(5); 1988; 1542-1545, 1569

Decay of surface tension of protein solutions obeyed an empirical equation for first-order decay during the first 10 to 60 min after formation of a new surface. First-order rate constant (K) for surface tension decay of protein solutions, calculated at various protein concn, were closely correlated with "foaming power" (foamability) of the solutions. A similar correlation between "foaming power" and K values was also observed for low mol wt, surfactant solutions. The K value for low mol. wt. surfactant solutions were lower than those for protein solutions with similar "foaming power" to surfactant solutions. Equilibrium surface tensions of low mol. wt. surfactant solutions were closely correlated with their "foaming power" though such correlation was not found in the case of protein solutions. AS

497 Lioutas (TS), Baianu (IC), Bechtel (PJ) and Steinberg (MP). Oxygen-17 and sodium-23 nuclear magnetic resonance studies of myofibrillar protein interactions with water and electrolytes in relation to sorption isotherms. **Journal of Agricultural and Food Chemistry** 36(3); 1988; 437-444

An NMR and water activity study of the interactions of myofibrillar protsins with soidum chloride and water is presented. Sorption isotherms are compared with high-field NMR data in an attempt to identify and quantitate different fractions of water. Salt "bound" to myofibrillar proteins in suspensions changed markedly the sorption isotherm; upon addition of 4% salt, the "monolayer" coverage, N_1 increased from 1.55 to 1.66 g of water/100g of solids; the total amount of "bound" water (N_I +C) increased from 22.6 to 27.2 g of water/100g of solids. The fraction of Na bound to the proteins increases with myofibrillar protein concn. up to a max. of 500 mol of $NaCl/10^6$ g of protein. Above 50% (w/v) protein, the water activity decreases rapidly whereas the ^{17}O NMR line width increases only slightly with increasing concn. of myofibrillar proteins. Such data are interpreted in terms of protein activity that becomes dominant above 20% (w/v) myofibrillar protein. The effects of ion binding and charge fluctuations on myofibrillar protein-protein interactions are briefly discussed. AS

498 Sheen (SJ) and Sheen (VT). Effect of chemical and enzymatic degradation on the functional properties of fraction-1-protein. **Journal of Agricultural and Food Chemistry** 36(3); 1988; 445-450

Chemical and enzymatic treatments for 30 min degraded F-1-p and altered its functional properties. A decrease in solubility and fat-binding capacity but an increase in emulsion viscosity were observed with proteins from hydrolysis at pH 11 and 110 C. Selective cleavage of tryptophenyl peptide bonds by N-chlorosuccinimide/urea reagent lowered water absorption, fat-binding capacity, and emulsion viscosity. Acid-(0.015 N HCl 110 C) and pepsin-treated proteins had resp. low and high emulsion viscosities, whereas both showed poor foaming capacity and stability. Protease digestion increased foaming properties but totally lost its emulsion viscosity. All degradations negligibly modified emulsion capacity. Prolonged treatments with acid and protease rendered the hydrolyzed proteins completely soluble at pH 3 and pH 9, resp., while their water and fat absorption progressively reduced. The native F-1-p is virtually superior in all functional properties measured over its degradation products, however, the latter remained comparable to or better in functionality than food proteins. AS

499 Tanimoto (S-Y) and Kinsella (JE). Enzymatic modification of proteins. Effects of transglutaminase cross-linking on some physical properties of Beta-Lactoglobulin. Journal of Agricultural and Food Chemistry 36(2); 1988; 281-285

Transglutaminase was isolated from guinea pig liver and used to cross-link Beta-lactoglobulin (and casein) via Epsilon-carboxyl (glutamine)-Gamma-amino (Lysine) isopeptide bond formation. The optimum reaction conditions (19 u mol of bond formation/min/mg of protein) was at pH 8 and required calcium (4mM). Both casein and Beta-lactoglobulin were faciley cross-linked to form a range of oligomers and polymers. Cross-linked Beta-Lg mol. were separated by ultrafiltration into polymers ranging in mol. mass from (20-99) x 10^3 and > 100 x 10^3 Da. These were readily dispersible and had reduced viscosities of 3.0 and 5.3 compared to 2.9 mL/g for native Beta-Lg. Dispersions of Beta-lg polymers were heat stable, remaining viscous at 100 C. Extensive polymerization of Beta-Lg resulted in the formation of weak gels. AS

Vitamins

500 Mayne (ST) and Parket (RS). HPLC analysis of vitamin E by conversion to Alpha-tocopheryl acetate in samples containing canthaxanthin or other coeluting compounds. Journal of Agricultural and Food Chemistry 36(3); 1988; 483-485

Canthaxanthin, a nonprovitamin A carotenoid and food colouring agent, and Alpha-tocopherol (vitamin E) often coexist in foods and tissues. As both canthaxanthin and Alpha-tocopherol are thought to be lipid-soluble antioxidants, it is sometimes necessary and often desirable to determine the concn. of both compounds in the same samples extract. We have previously reported that canthaxanthin beadlets, capsules, and tablets, primarily used for food-colouring purposes, contained cis- and trans- canthaxanthin and two other carotenoid-like compounds. One of these compounds was found to coelute with Alpha-tocopherol by conventional HPLC methods of analysis of vitamin E. A reversed-phase HPLC method was therefore devised to quantitate low levels of Alpha-tocopherol in the presence of canthaxanthin and its accompanying chromophores by first converting Alpha-tocopherol to its acetate derivative. Acetylation resulted in a more hydrophobic analyte and a correspondingly increased retention time. By this method it was found that chicks fed semipurified diets supplemented with canthaxanthin beadlets had a significantly higher mean hepatic Alpha-tocopherol content, as well as a significantly lower mean hepatic retinol content, than chicks fed diets supplemented with carotenoid-free placebo beadlets. AS

Nutrition

501 Anon. Fats in the diet. Why and where? Food Technology in Australia 40(3); 1988; 94-98

This review covers various aspects of the role of fats and oils in the diet, food processing and cooking. It describes nutritional value of fat, use of fat in processed foods, changes in our dietary pattern and the definitions and requirments for fat content of some foods, saturated and unsaturated fats, processing of fats, role of cholesterol, dietary recommendations concerning fat etc. NGKR

TOXICOLOGY

502 Anon. Evaluation of caffeine safety. **Food Technology in Australia** 40(3); 1988; 106-111, 114-115

This review discusses evaluation of caffeine safety based on a scientific status summary by the Institute of Food Technologists, Expert Panel on Food Safety and Nutrition. It covers caffeine content of beverages, foods and drugs, physiological effects, toxicity, questions of safety. Alternatives to caffeine-containing beverages, coffee decaffeination. Tea decaffeination, safety of methylene chloride decaffeinated coffee and summary. NGKR

503 Inoue (T), Ishiwata (H) and Yoshihira (K). Aluminum levels in food simulating solvents and various foods cooked in aluminium pans. **Journal of Agricultural and Food Chemistry** 36(3); 1988; 599-601

Mycotoxins

Aflatoxins

504 Arun Sharma, Padwal-Desai (SR) and Nadkarni (GB). Effect of aldehyde trapping agents on ethylene and aflatoxin biogenesis in **Aspergillus parasiticus**. **Journal of Agricultural and Food Chemistry** 36(3); 1988; 546-548

Dimedone, an aldehyde trapping agent, was found to stimulate ethylene evolution while suppressing aflatoxin biogenesis in **Aspergillus parasiticus**. Dimedone did not seem to affect the growth of the fungus. Potassium metabisulphite, another aldehyde trapping agent, was also found to be an effective inhibitor of aflatoxin biogenesis. Unlike dimedone, however, this compound inhibited the growth of the fungus. Stimulation of ethylene evolution by aldehyde trapping agents shows that ethanol is not the precursor of ethylene in fungi. AS

505 Groopman (JD) and Donahue (KF). Aflatoxin a human carcinogen. Determination in foods and biological samples by monoclonal antibody affinity chromatography. **Journal of the Association of Official Analytical Chemists** 71(5); 1988; 861-867

The use of monoclonal antibody preparative affinity columns represents a major break through for analytical chemists and permits efficient isolation and analysis of aflatoxins from food grain samples, as well as aflatoxin M from milk. MNK

506 Mislivec (PB), Trucksess (MW) and Stoloff (L). Effect of other toxigenic mold species on aflatoxin production by **Aspergillus flavus**

in sterile broth shake culture. Journal of Food Protection 51(6); 1988; 449-451

The effect of **Aspergillus ochraceus**, **A.** **versicolor**, **Penicillium citrinum**, **P. cyclopium** and **P. urticae** on production of aflatoxin by **A. flavus** when grown together with **A. flavus** in rotary shake culture was investigated. The two aspergilli had no apparent effect on aflatoxin production, whereas all three **Penicillium** sp. substantially lowered aflatoxin production. The toxins that these penicillia produced when growing in pure culture were not found when the penicillia were grown with **A. flavus**. However, these toxins had no effect on aflatoxin production added to the growth media, nor did the three molds metabolize aflatoxin. When **A. flavus** was grown in both filter and autoclave-sterilized filtrates of these three sp. no aflatoxins were produced, although **A. ochraceus** and **A. versicolor** have no apparent effect on aflatoxin production, **P. cirtinum**, **P. cyclopium** and **P. urticae** produce heat-stable, nonfilterable metabolite(S) which inhibit(s) aflatoxin production by actively growing **A. flavus**. AS

Fusarium

507 Bhavanishankar (TN), Ramesh (HP) and Shantha (T). Dermal toxicity of **Fusarium** toxins in combinations. **Archives of Toxicology** 61(3); 1988; 241-244

T-2 toxin (T2), diacetoxyscirpenol (DAS), fusarenon X (FX) and butenolide (Bd) at concn. of 0.2, 0.3, 5 and 10 µ g/site, resp., were applied individually and in combinations on shaved skin of guinea pigs. Erythema and induration were observed on skin patches treated with the toxins. Increase in the thickness of stratum malpighii was the major histological change observed. Mild to moderate degeneration of fibrocytes and cellular infiltration were found in the corium of skin treated with FX, Bd, DAS and T2. The order of toxicity of individual toxins was T2 > DAS > FX > Bd. Combinations of T2 + FX and T2 + Bd resulted in antagonism, while DAS + FX and DAS + Bd caused synergism. AS

FOOD LAWS AND REGULATIONS

Nil

Just Published

BANANA IN INDIA

Production - Preservation - Processing

An informative industrial monograph covering production, propagation, cultivars, harvesting, yield, chemical composition and post harvest technologies for handling, transportation, storage, ripening, marketing and export of banana. The processed products covered include banana pulp, fig, liquid fruit, juice concentrate, toffee, deep fat fried chips, powder, fruit bar, squash and brandy. Brief note on physiological disorders and suggestions to minimise losses in marketing channel adds further to the usefulness of the publication. Price Rs.30/- + VPP charges.

Our forthcoming publications in the Series:

1. Orange in India
2. Mango: an Industrial Profile

All correspondence should be addressed to:

The Area Coordinator
FOSTIS
CFTRI, Mysore - 570 013.

GENERAL

508 Andreotti (R), Tomasicchio (M), Pezzani (G), Pirazzoli (P) and Ambroggi (F). Studies on the quality and stability of some frozen foods. Industria Conserve 73(1); 1988; 3-25 (It).

Tests on the shelf-life of different frozen foods (vegetables, meat and fish products, snacks ready prepared dishes) were carried out. The products, supplied by food freezing factories and stored at -15, -18 and -25 C, were periodically sampled and subjected to sensory evaluations in comparison with their counterparts stored at -40 C, taken as controls. From the results of the sensory evaluation the original quality life and the acceptability life of the products for storage at -15, -18 and -25 C were determined. The detn. were found to be easier for simple and homogeneous products such as vegetables. This is in agreement with the fact that the shelf life of frozen products is affected not only by storage temp., but also by the characteristics of the products, by processing and packaging (PPP factors). On account of this, tolerances for the original quality life of the products were introduced. AS

509 Berkowitz (D). High potential ingredients. Activities Report 40(1); 1988; 71

510 Bhavnani (JK). Agricultural and food products- a review of standardization activities. ISI Bulletin 2(5); 1988: 189-192, 210

The work already accomplished in the standardization of processed foods and the future plans for standardization in food safety, dietary foods, fast foods and fish and fisheries have been briefly mentioned. MVG

511 Blacher (N). Demographic and consumer trends in fast food. Activities Report 40(1); 1988; 8-13

512 Bloss (M). Quality assurance fast food restaurants. Activities Report 40(1); 1988; 14-16

513 Chadha (DS). Role of standardization of foods in the growth of food industry. ISI Bulletin 2(5); 1988; 196-198

After briefly touching on the processed food industry in India and the need for standardization, the author mentions the role of Bureau of Indian Standards Organisation, Prevention of Food Adulteration Act and Agmark and other regulations in providing quality assurance through standardization. MVG

514 Siegel (SF) and Warren (PH). Designer compacts. Artificial intelligence strategies. **Activities Report** 40(1); 1988; 83-92

Discusses the process of optimizing a food product and isolate some domains of knowledge that are critical ingredients in the process. A method is proposed based on Artifical Intelligence technology, which can provide a cost-effective way of utilizing various sources of expertise in the process of optimising a food product. BV

515 Stone (PL). The effects of dietary change on industrty. **Food Technology in Australia** 40(4); 1988; 144-146, 149

516 Swaminathan (MS). Sustainable food and nutrition security for the 1990's. **Agricultural Situation in India** 43(5); 1988; 363-367

517 Taub (IA). Technology base investment strategy. Evolving food service systems and concepts. **Activities Report** 40(1); 1988; 20-30

FOOD PROCESSING

518 Lopez Leiva (MH). The use of electrodialysis in food processing. Part 2. Review of practical applications. **Lebensmittel-Wissenschaft und-Technologie** 21(4); 1988; 177-182

In this second part an extensive review of the practical uses of electrodialysis in food processing is presented. This technique, primarily used for de-ashing of solutions, shows in the processing of liquid foods clear advantages over the traditional techniques. Areas of applications covered include dairy products, grape musts and wine, protein fractions, sugar solutions and syrups, fruit juices, and other related areas. 34 references. BV

Extrusion

519 Ferry-Wilczek (H), Melcion (J-P), Gàborit (T) and Della Valle (G). Use of a tracer to estimate the severity of processing as a function of residence time inside a twin screw extruder. **Sciences des Aliments** 8(1); 1988; 133-148

The denaturation of antitryptic factors extracted from peas has been studied as a function of residence time inside a co-rotative twin screw extruder, in order to characterize the severity of the treatment. In our conditions with maize starch, residence time distribution in an extruder can be described by a plug flow reactor associated with a series of continuously stirred tank reactors (N: 1.5 to 3.9). The denaturation of pea trypsin inhibitors (MW: 15 000) follows a first order kinetics similar to the heat denaturation of enzymes. The extruder may be divided into two parts: the feed zone, where the product is conveyed without any modification (plug flow reactor) and a transformation zone (continuously stirred tank reactors), where the process conditions seem to be homogeneous. The severity of processing can be characterized by an equivalent mean temp. **AS**

FOOD PACKAGING

520 Hartley (D). Packaging-Quo Vadis? **Food Technology in Australia** 40(10); 1988; 410-411

This review discusses various aspects of packaging industry, impact of plastic developments. The beverage industry, microwave cooking, the paper industry, testing, and computer tech. NGKR

Packaging materials

521 Kelley (N). High barrier nonmetallic retortable packaging materials. **Activities Report** 40(1); 1988; 46-49

Aluminium

522 Naresh (R), Mahadeviah (M) and Gowramma (RV). Electrochemical studies of aluminium with model solutions and vegetables. **Journal of Food Science and Technology, India** 25(3); 1988; 121-124

Electrochemical studies of plain and lacquered aluminium sheet have been carried out with model solutions and a few vegetables. Variation in galvanic current and potential readings were noted during storage upto 100 h. Influence of some corrosion accelerators and inhibitors was studied. The results of these studies are useful to predict the performance of aluminium cans with different vegetable products and the influence of various accelerators and inhibitors of corrosion. **AS**

Cans

523 Brewbaker (PL) and Henderson (JM). Experimental verification and use of pressurized can models. **Journal of Food Process Engineering** 10(2); 1988; 133-149

The results of an experimental investigation of the strength characteristics of pressurized food cans are compared with existing models of thin-walled cylinders as they pertain to the common unbeaded can. After using the data to establish the empirical quantities in the models, good agreement was found between theory and exp. The models were then used to predict strength characteristics of hypothetical cans. **AS**

524 Taki (T) and Ohno (M). Development of composition can for "Kitchen Salt". **Packaging Japan** 9(43); 1988; 36-40

Retort pouches

525 Mansur (RT). Low temperature retort pouch materials. **Activities Report** 40(1); 1988; 50

526 Mansur (RT). Nondestructive high speed leak testing for retort pouches. **Activities Report** 40(1); 1988; 48-49

Steel

527 Catala (R), Perez (E), Giner (V), Fernandez (B) and Cabanes (JM). Characterization of new low-tin coated steel and suitability for canning different foodstuffs. **Revista de Agroquimica y Tecnologia de Alimentos** 28(1); 1988; 135-144 (Es).

A new tinplate with a nominal tin content of 1.4/1.4 g m^2 , a compact and homogeneous tine deposition and a high chromium content, has been developed. After initial experiments at lab. level, the production was carried on at industrial level. The material was characterised and its behaviour studied by canning a wide range of food products of different characteristics and potential corrosiveness in several can sizes. The new tinplate, with either mat or bright finish and adequately lacquered showed a behaviour similar to conventional 2.8 gm^2 tinplate when used with moderately corrosive foods. AS

FOOD ENGINEERING AND EQUIPMENT

Engineering

528 Abichandani (H) and Sarma (SC). Residence time distribution in horizontal thin film scraped surface heat exchanger (SSHE). **Journal of Food Process Engineering** 10(2); 1988; 71-80

The residence time distribution (RTD) studies were conducted to predict the flow charactoristics in thin film SSHE. The experiments were conducted at zero heat flux using water as working fluid. A pulse input in the form of saturated soidum chloride solution was used as the disturbance at inlet and the response in form of electrical conductivity was measured at outlet. Thirty-two trials were conducted at different flow rates, number of blades and rotor speeds. The E-curves were plotted. It was infered that the flow in thin film SSHE approx. to plug flow. Also, as the mass flow rate increased, RTD improved. The increasing number of blades resulted in appreciable improvement in RTD. The rotor speed had similar effect as that of number of blades on RTD. However, the number of blades had more profound effect as compared to rotor speed. If the rotor design is modified then RTD can be improved and simultaneously the power consumption can be kept at min. AS

529 Lacroix (C) and Castaigne (F). Freezing time calculation for products with simple geometrical shapes. **Journal of Food Process Engineering** 10(2); 1988; 81-104

A simple model is proposed to estimate freezing times of foodstuffs of simple geometrical shapes (infinite flat slabs, infinite cylinders, spheres, rectangular parallelepipeds and finite cylinders)

This model combines Plank's equation for changes of phase period with the unsteady heat transfer solutions for cooling periods before and after phase change. The total freezing time is obtained by the detn. and the summation of the precooling, phase change and tempering times. The results produced are atleast as accurate as or better than any of the previous methods, including regression formula and finite difference computations. Tables required for fast and accurate predictions of freezing times of foodstuffs with this method are provided. AS

530 Pickard (D). Energy generation and distribution. **Activities Report** 40(1); 1988; 55-61

531 Rosenberg (M), Talmon (Y) and Kopelman (IJ). The microstructure of spray-dried microcapsules. **Food Microstructure** 7(1); 1988; 15-23

The application of improved scanning electron microscopy (SEM) techniques to study the effects of wall composition and drying conditions on the inner and outer structure of spray-dried microcapsules has been studied. Results show how the core material is organised in the solid wall matrix, existence of one or more internal voids in the microcapsules, and how these microstructural features are affected by solids concn in the sprayed emulsion, and by feed and drying air temp. MVG

532 Stankiewicz (K) and Rao (MA). Heat transfer in thin-film wiped-surface evaporation of model liquid foods. **Journal of Food Process Engineering** 10(2); 1988; 113-131

Experimental product-side heat transfer coeff. were studied in a lab. scale thin-film wiped-surface (TFWS) evaporator under different rotational speeds, liquid flow rates and temp. of the heating medium. Experiments were conducted with water, and 10, 30, and 45% sugar solutions in order to simulate the conditions during evaporation of fruit juices. Dimensionless correlations for heat transfer coeff. were established. It was shown that the "equivalent diameter" of the liquid flow wave formed in the front of wiper blade could be used as a characteristic dimension. Magnitudes of unstable and stable modes of evaporator performance were determined and different regimes related to the liquid flow were revealed. AS

533 Sugiyama (J). Electrical properties of foods for quality evaluation (Part I). **Journal of Japanese Society of Food Science and Technology '(Nippon Shokubin Kogyo Gakkaishi')** 35(9); 1988; 647-653 (Ja).

Drying

534 Yand (TCS), Briggs (J), Ayoub (J), Wright (B) and Taub (IA). Preservation and stabilization technologies for combat rations. **Activities Report** 40(1); 1988; 75-82

Covers novel drying technologies, microwave-assisted freeze-drying, centrifugal fluidized bed drying, material carrying body drying, novel architecturing technologies, compression technology, extrusion infusion technology, advanced thermoprocessing technologies, unviersal process system. BV

Equipments

535 Masutani (K). Long plate type one-pass vacuum evaporator. **Packaging Japan** 9(43); 1988; 66-70

This evaporator has a complete one-pass performance and can be said the most reasonable equipment for condensing heat sensitive liquids. Furthermore, this is well effective to normal liquids which are not so sensitive against heat, compared with other types of equipment. It is appreciated from the view of the characters in energy saving, maintenance, compactness and low cost. AS

ENERGY IN FOOD PROCESSING

Nil

FOOD CHEMISTRY AND ANALYSIS

Chemistry

536 Groenen (PJ) and Busink (E). Alkylating activity in food products-especially sauerkraut and sour fermented dairy products-after incubation with nitrite under quasi-gastric conditions. **Food and Chemical Toxicology** 26(3); 1988; 215-225

N-Nitroso compounds may well rank high among the genotoxic carcinogens present in our environment. Small amounts of such compounds may be formed in the human stomach after consumption of high-nitrate vegetables. Volatile nitrosamines can be conveniently determined but reliable methods of analysis for non-volatile N-nitroso compounds are still lacking. In this study we have used the 4-(4-nitrobenzyl) pyridine test to look for the formation of alkylating compounds such as N-nitroso-N-methylurea in a wide range of food products after incubation with nitrite under simulated gastric conditions. Our results indicate that many food products do not form alkylating compounds in appreciable amounts, even though the nitrite concn used was five to ten times that found in saliva after a high-nitrate meal. Comparatively strong alkylating activity, however, was detected after incubation of samples of sauerkraut, certain dairy product (yoghurt, biograde, quark, buttermilk and milk), wine and smoked mackerel. Samples of sauerkraut incubated with simulated gastric fluid, but without (added) nitrite, also displayed appreciable alkylating activity. The formation of alkylating substance in non-fat yoghurt was markedly inhibited by addition of ascorbic acid. The formation identity of the alkylating agents remains unknown. The isolation procedure was optimized for N-nitroso-N-methylurea, but will certainly resulted in the isolation of other compounds, such as C-nitroso-, C-nitro, or perhaps even C-nitroso, C-nitro compounds, as well. Biogenic amines, glucosinolates, indole derivatives or other compounds may be involved as precursors. If alkylating agents are formed **in vivo** after ingestion of high-nitrate vegetables or drinking water, this is likely to occur only when the food products mentioned above are ingested simultaneously with or shortly after the nitrate load and not appreciable (except perhaps in the case of sauerkraut) when they are ingested alone, without a nitrate source. AS

537 Palmia (F). Water activity of food products. Properties and methods of determination. **Industria Conserve** 63(1); 1988; 50-56 (It).

Water activity is one of the factors affecting the keeping quality of food products as regards microbial and enzymic degradation; its value is primarily a function of water and solute contents. The thermodynamic derivation of this parameter is briefly described together with the possibilities of calculating its value in aquerous solutions. The use and meaning of sorption isotherms of food materials are outlined and two models commonly used for their detn. are given by way of example. The methods for measuring water activity are then reviewed and finally the availability of standards for calibrating the measuring devices and procedures is discussed. AS

Chemistry(Analytical)

538 Sastry (CSP), Ekambareswara Rao (K), Vijaya (D), Ramamohana Rao (A) and Veerabhadra Rao (M). Spectrophotometric methods for the determination of morin, quercetin, tannin and chlorogenic acid. Journal of **Food Science and Technology, India** 25(3); 1988; 156-157

Simple spectrophotometric methods for the detn. of some polyphenolic compounds have been described using two pairs of reagents; metol -Cr(VI) for morin and tannic acid and m-aminophenol-periodate for quercetin and chlorogenic acid. The methods are reproducible, accurate within plus or minus 1.5% and are applicable for estimation in foodstuffs. AS

FOOD MICROBIOLOGY AND HYGIENE

Enzymes

539 Ehlers (GM). New industrial enzymes for extraction and synthesis. Food **Technology in New Zealand** 23(3); 1988; 31

This covers description of pectinex ultra SP-L, a pectinase containing various side activities marketed for fruit industry, processing of stored apples with this enzymes, synthesis of esters, synthesis of long chain aliphatic esters, interesterification processes used in fats and oils industry such as transesterification of soybean oil and beef tallow, palm stearin and coconut oil. NGKR

Lipases

540 Gillis (A). Research discovers new roles for lipases. **Journal of the American Oil Chemists" Society** 65(6); 1988; 846, 848-850

A feature article on research to develop lipases for enzyme technology is presented. MNK

541 Roussis (IG), Karabalis (I), Papadopoulou (C) and Drainas. (C). Some properties of extracellular lipase from a **Pseudomonas fluorescens** strain. **Lebensmittel-Wissenschaft und-Technologie** 21(4); 1988; 188-194

The extracellular lipase from a **Pseudomonas fluorescens** strain - a member of raw milk flora-was isolated and partially characterized. The enzyme had a mol. wt. of 58, 200 with a K_m value for butter fat 12.92 mg, ml^{-1} The pH and temp. optima were 8.0 and 23 C resp. The lipase appeared to be a serine enzyme although Ca^{2+} seemed to participate to the catalytic process. The inactivation of lipase in buffer solutions at temp. 100-140 C followed first order kinetics with E 56, 200 J. mol^{-1} . The purified lipase was more sensitive than the crude enzyme preparation at 55 C. Although Ca stabilized lipase at 55 Degree C, it had insignificant effect on lipase tolerance at 95 C. Protease production was longer at 23 C than at 4 C as well as at periodically agitated cultures. On the contrary, lipase production was higher at 4 C and at stationary cultures. However, it was not clear whether the higher levels of lipase in these case were due exclusively to the action of protease, since purified protease from the same strain, reduced the lipolytic activity of crude extracts. AS

Rennets

542 Tewari (BD) and Singh (S). Microbial rennet-its production and use. **Indian Dairyman** 40(2); 1988; 79-82

Lab. production of microbial rennet using **Absidia ramosa** isolated from wheat bran and maintained on potato dextrose agar has been described, and compared with other methods described in literature. Uses of microbial rennet as a substitute for calf rennet are also mentioned. MVG

Fermentation

543 Miyao (S) and Ogawa (T). Selective media for enumerating lactic acid bacteria groups from fermented pickles. **Journal of Japanese Society of Food Science and Technology '(Nippon Shokuhin Kogyo Gakkaishi')** 35(5); 1988; 610-617 (Ja).

For enumerating the groups of lactic acid bacteria in fermented pickles, selective effects of PES (Phenyl Ethyl Alcohol-Sucrose Agar), M-Enterococcus and M-LBS media were studied by the use of bacteria closely related to fermented pickles. it was suitable for enumeration of leuconostocs to incubate for 3 or 4 days at 20 C using the PES medium containing sucrose and phenyl ethyl alcohol due to the production of dextran and the inhibition of Gram-negative bacteria. The commercially available M-Enterococcus agar medium was applicable to enumerate streptococci and pediococci by incubation for 3 or 4 days at 37 C. It was suitable for enumeration of lactobacilli to incubate for 4 days at 30 C using the M-LBS medium modified by addition of acetic acid and sodium acetate to the commercially available LBS medium. Effectiveness of the enumerating media described nere was confirmed by applying to examine the changes of microflora during the fermentation of cabbage. AS

Microorganisms

544 Murphy (FJ) and Mepham (P). Microbial quality of ice cubes. A survey. **British Food Journal** 90(3); 1988; 120-122

Today many drinks and beverages are kept cold and palatable by the addition of ice. Most establishment have a machine for making ice cubes, and many have equipment for producing crushed or flaked ice. Tjoa et al. (1977), studying the association of popular drinks and travellers diarrhoea in Central America, examined the survival of four entropathogenic organisms in ice: **Shigella flexneri, Shigella sonnei, Escherichia coli** and **Salmonella typhi**. The results showed that all the organisms survived freezing for 24 h followed by melting in alcohol, even when this was 86 C proof tequila. A low mortality of **E. coli** at -2 C was found by Russel (Russel and Osterud 1945). This was confirmed in recent work when it was found that coliform bacteria can grow slowly at temp. as low as 1.5 C (Gross, 1984). A pilot study was undertaken in leeds (Environmental Health Department, 1984) on samples of ice taken from various ice buckets. Total viable counts (TVC) in excess of 1,000 organisms per millilitre were recorded. These findings indicate the possible risk posed by enteric pathogens, once introduced into or onto ice that is to be served with drinks. This survey aims to investigate whether the techniques, used to produce and handle ice in British public houses, can create a significant health risk to the customer. AS

Bacteria

545 Spicher (G) and Nierle (W). Proteolytic activity of sourdough bacteria. **Applied Microbiology and Biotechnology** 28(4/5); 1988; 487-492

Proteolytic activity during the fermentation of sourdough results in an increase in amino acid content. The proteolysis is caused by flour enzymes, microbial enzymes of flour and by sourdough bacteria. The results indicate that the lactic acid bacteria of sourdough are important for proteolytic activity depends on the species of bacteria. Homo- and heterofermentative sourdough bacteria effect different amino acid spectra. Qualitative and quantitative differences in sulphur-containing, cyclic and hydroxy amino acids nave been observed. The proteolytic process can be influenced by fermentation conditions, especially the temp. A lesser effect is observed in the dough yield (flour-water relationship). From experiments with different strains and species of lactic acid bacteria, it is concluded that only one third of the proteolytic activity in sourdough is based on proteases from the flour. AS

Bacillus stearothermophilus

546 Kubo (M), Murayama (K), Seto (K) and **Imanaka** (T). Highly thermostable neutral protease from **Bacillus stearothermophilus. Journal of Fermentation Technology '(Hokko Kogaku Zasshi')** 66(1); 1988; 13-17

Bacillus stearothermophilus MK232, which produced a highly thermostable neutral protease, was isolated from a natural environment. By several steps of mutagenesis, a hyper-producing mutant strain, YG185, was obtained. The enzyme productivity was twice as much as that of the original strain. This extracellular neutral protease was purified and crystallized. The mol. wt. of the enzyme was 34,000 by SDS-polyacrylamide gel electrophoresis and gel filtration. The optimum pH and temp. for the enzyme activity were 7.5 and 70 C, resp., and the enzyme was stable at pH 5-10 and below 70 C. The thermostability and specific activity of the new protease are around 10% and 40% higher than those of thermolysin (the neutral protease from **Bacillus thermoproteolyticus**), resp. The enzyme was inactivated by EDTA, but not by phenylmethylsulphonyl fluoride. These results indicate that the enzyme is a highly thermostable neutral-(metallo) protease. AS

Bacillus subtilis

547 Kole (MM), Draper (I) and Gerson (DF). Protease production by Bacillus subtilis in oxygen-controlled, glucose-fed-batch fermentations. **Applied Microbiology and Biotechnology** 28(4/5); 1988; 404-408

An open-loop, on-off control system using the dissolved oxygen level to control a glucose feed was used in a study of growth and production of protease by **Bacillus subtilis** CNIB 8054. With this system, both glucose and oxygen were controlled at low concn. In batch fermentations, protease activity in the fermentation broth was max, when growth had stopped. During oxygen-controlled, glucose fed-batch fermentations, growth and the production of protease activity continued during glucose feeding. Oxygen-controlled, glucose fed-batch fermentations produced more protease activity than batch fermentations, depending upon the set point for dissolved oxygen. These results indicate that control of glucose and oxygen concn. can result in improvements in protease production. AS

Erwinia citreus

548 Grindley (JF), Payton (MA), Van de Pol (H) and Hardy (KG). Conversion of glucose to 2-keto -L- gluconate, an intermediate in L-ascorbate synthesis, by recombinant strain of **Erwinia citreus. Applied and Environmental Microbiology** 54(7); 1988; 1770-1775

A gene for 2, 5 diketo-D-gluconate reductase was cloned from **Corynebacterium** sp. and expressed in **Erwinia citreus** a strain which oxidises glucose to 2, 5 diketo-D-gluconate. The recombinant microorganisms converted glucose to 2-keto-L-gluconate, a compound which can be readily converted into L-ascorbate (vitamin C). RJ

Pseudomonas fragi

549 Herald (PJ) and Zottola (EA). The use of transmission electron microscopy to study the composition of **Pseudomonas fragi** attachment material. **Food Microstructure** 7(1); 1988; 53-57

Electron microscopy techniques were used to study the attachment matrix of **Pseudomonas fragi** ATCC 4973. Scanning electron microscopy (SEM) was used to demonstrate the presence of attachment fibrils of P. **fragi** adhered to stainless steel. Transmission electron microscopy (TEM) was used to examine thin sectioned cells stained with ruthenium red of alcian blue. Extracellular substances surrounding cells stained with ruthenium red or alcian blue had a mat- or spike-like morphology. This indicated that these substances were acidic mucopolysaccharides that may be involved in the attachment of **P. fragi** to food contact surfaces. AS

Staphylococcus

550 White (DG), Matos (JS), Harmon (RJ) and Langlois (BE). A comparison of six selective media for enumeration and isolation of staphylococci. **Journal of Food Protection** 51(9); 1988; 685-690

The efficacy of Baird-Parker agar, Baird-Parker agar with bacitracin (0.8 μ g/ml), Baird-Parker agar supplemented with acriflavin (7 μ g/ml), polymyxin (20 units/ml) and sulphonamides (55 μ g/ml), KRANEP agar, mannitol salt agar, and **Staphylococcus** medium 110 agar for the isolation and enumeration of **Staphylococcus** sp. was investigated. Bovine blood agar was used as the control medium. Thirty-seven staphylococci strains representing 23 sp. and 19 non-**Staphylococcus** sp. were tested. None of the six selective media supported the growth of all 37 **Staphylococcus** strains. The number of **Staphylococcus** sp. that grew on a specific medium ranged from only the **S. aureus** strains on Baird-Parker agar supplemented with acriflavin, polymyxin, and sulphonamides, to all but **S. warneri** BG 647 on **Staphylococcus** medium 110 agar. Strains of **Bacillus**, **Corynebacterium**, and **Micrococcus** grew on all six selective meida. AS

Fungi

Aspergillus niger

551 Manonmani (HK) and Sreekantiah (KR). Effect of additives on citric acid production by **Aspergillus** niger. **Journal of Food Science and Technology, India** 25(3); 1988; 159-161

Citric acid production by **Aspergillus niger**-16 was studied by solid state fermentation on sugarcane bagasse fortified with sucrose medium. Ethanol and coconut oil at 3% (V/W) level increased the production of citric acid. Fluroacetate at a concn of 1.0 mg/15g bagasse enhanced the yield of citric acid significantly. Addition of ethanol and fluoracetate after 6 h of growth gave max. conversion. **AS**

552 Oriol (E), Schettino (B), Viniegra-Gonzales (G) and Raimbault (M). Solid-state culture of **Aspergillus niger** on support. **Journal of Fermentation Technology '(Hokko Kogaku Zasshi')** 66(1); 1988; 56-62

The growth kinetics of **Aspergillus niger** on a solid support i.e. sugarcane bagasse, impregnated with a liquid glucose medium, were investigated under different culture conditions. The water activity of the medium, the amount of spore inoculum and the support particle size were shown to be critical factors for mold growth. The elevated rates of growth observed with high substrate conc. media demonstrated the feasibility of the method for culturing filamentous fungi. **AS**

Mushrooms

553 Bano (Z) and Rajarathnam (S). **Pleurotus** mushrooms. Part II. Chemical composition, nutritional value, post-harvest physiology, preservation, and role as human food. **CRC Critical Reviews in Food Science and Nutrition** 27(2); 1988; 87-157

The fruit bodies of **Pleurotus** sp. as a class of "Edible Fungal Foods" have been discovered to have definite nutritive and medicinal values. They are a good source of nonstarch carbohydrates, dietary fiber (that can help in reducing the plasma cholesterol), most of the essential amino acids, minerals and vitamins of B group, and folic acid (necessary to counteract pernicious anaemia) in particular. Considering the essential amino acid index, biological value, in vitro, digestibility, nutritional index, and protein score, **Pleurotus** sp. fall between high grade vegetables and low grade meats. Fractions of water-soluble polysaccharides are reported to possess antitumor activity. The physiological processes such as changes in water content, respiratory, rate, texture, colour, and activities of enzymes like proteases and polyphenol oxidases during the after-harvest life are delineated. The problems and prospects of processing the fruit bodies by various methods are discussed. Potentialities for production and consumption of the fruit in different parts of the world are brought out. **AS**

554 Bhatt (RP) and Lakhanpal (TN. **Amanita fulva** (Schaeff. Ex) Pers.-an edible mushroom new to India. **Current Science** 57(20); 1988; 1126-1127

An edible mushroom hitherto unrecorded in India has been collected from the North-Western Himalayas during 1981-83. This mushroom sp. **Amanita fulva** (Schaeff. Ex) pers, is characterised by reddish orange to reddish brown cap with striated margin, lack of annulus and white, free, saccate Volva. It is distinguished from the closely related **Amanita vaginata** (Bull ex. Fr.) Witt, by its cap colour. NGKR

Yeasts

555 Weber (H) and Barth (G). Nonconventional yeasts. Their genetics and biotechnological applications. **CRC Critical Reviews in Biotechnology** 7(4); 1988; 281-337

To date, more than 500 sp. of yeasts have been described. Most of the genetic and biochemical studies have, however, been carried out with **Saccharomyces cerevisiae**. Although a considerable amount of knowledge has been accumulated on fundamental processes and biotechnological applications of this industrially important yeast, the large var. of other yeast genera and sp. may offer various advantages for experimental study as well as for product formation in biotechnology. The genetic investigation of these so-called unconventional yeasts is poorly developed and information about corresponding data is dispersed. It is the aim of this review to summarize and discuss the main results of genetic studies and biotechnological applications of unconventional yeasts and to serve as a guide for scientists who wish to enter this field or are interested in only some aspects of these yeasts. AS

Hygiene

556 Worsfold (D). Hygiene of cold buffet displays. **British Food Journal** 90(3); 1988; 111-113

BIOTECHNOLOGY

557 Bonk (DT). FDA regulation of biotechnology. **Food Drug Cosmetic Law Journal** 43(1); 1988; 67-83

TISSUE CULTURE

Nil

FOOD ADDITIVES

558 Hayashi (M), Kishi (M), Sofuni (T) and Ishidate (MJr). Micronucleus tests in mice on 39 food additives and eight miscellaneous chemicals. **Food and Chemical Toxicology** 26(6); 1988; 487-500

A total of 47 chemical substances including 32 synthetic food additives, seven additives from natural sources, three trihalogenated methanes, two fluoro-compounds for dental use, one insecticide , and two other compounds were subjected to the micronucleus test in mice. Five compounds, i.e., chlorine dioxide, maltol, potassium bromate, sodium chlorite and sodium dehydroacetate, were found to induce micronuclei after a single ip injection. Potassium bromate, sodium chlorite and sodium dehydroacetate were tested further by oral administration, and potassium bromate showed a clearly positive results. Almost all the compounds which were negative with the single treatment were additionally tested by four or five multiple treatments, but none showed any indication of micronucleus induction. AS

Antioxidants

BHA

559 Pastorelli (R), Ancidei (A), Fanelli (R) and Airoldi (L). **Effect of acute and chronic butylated hydroxyanisole administration on in vivo glucuronidation of N-nitrosobutyl (4-hydroxybutyl) amine in rats. Food and Chemical Toxicology** 26(5); 1988; 419-423

The urinary metabolic pattern of N-nitrosobutyl (4-hydroxybutyl) amine (NB4HBA) administered at a dose of 5 mg/kg body wt. was studied in animals either pretreated with butylated hydroxyanisole (BHA) as a single oral dose of 50 or 250 mg/kg, or fed a diet containing 0.1 or 0.5% BHA. The 23 h urinary excretion of NB4HBA its glucuronic acid-conjugate (NB4HBA-G)and N-nitrosobutyl (3-carboxypropyl) amine (NB3CPA) in control rats were 0.12, 0.75 and 30% of the administrated dose, resp., and were not changed after a single oral dose of 50 mg BHA/kg. NB4HBA-G was significantly reduced in the urine of rats given 250 mg BHA/kg. **In vitro** assays carried out using rat-hepatic microsomal preparations as the source of the enzyme UDP-glucuronyl transferases (GT) and NH4HBA as the substrate, suggest that a competition between NG4HBA and BHA for the same enzyme may be the cause of the decreased NB4HBA-G excretion observed **in vivo.** A fourfold increase in NB4BHA-G urinary excretion was observed after chronic 0.5% BHA feeding, moreover, the glucuronic acid-conjugate of NB3CPA (NB3CPA-G), which was not detected in the controls or after acute BHA treatment, appeared in the urine of rats given dietary BHA for 3 wk, accounting for about 10% of the administered NB4HBA. **In vitro** experiments indicate that the increased glucuronides excretion may be the result of an elevated hepatic GT activity. AS

Lecithin

560 Nasner (A). **Does lecithin have anti-oxidizing properties. Confectionery Production** 54(9); 1988; 574-577

The antioxidizing properties of crude soybean lecithin and its alcohol soluble and alcohol insoluble fraction are proved in storage trials with sunflower oil and lard. The addition of a very small quantity of these phospholipids to oils after refining process improves the stability of these oils. The antioxidizing properties of phospholipids depend on composition of phospholipids and tocopherol content of the oils. The alcohol soluble fraction of soybean lecithin performed the best antioxidizing results. SYR

Flavours

561 Woolard (A) and Gilbert (T). **Applying savoury flavours. Food, Flavourings, Ingredients, Packaging and Processing** 10(2); 1988; 49

A more economical method of applying flavours, oils and slurries to many products by using a 'spinning disc'. Spraying system is described. Very accurate spray patterns and no effective loss of product were claimed as advantages. In additions to applying flavours, spinning disc systems are used to spray release agents directly on to oven bands; glaze on to pies and pastries, barrier creams on to wafers and pastries and water humidifiers on to products whose wt. must not be increased by more than 0.1%. **SYR**

Preservatives

Antimicrobials

562 Salih (FM), Al-Deen (JHS) and Hindi (LH). Prediction of growth of **Bacillus pumilus** as affected by spore load and chlorhexidine acetate concentration. **Journal of Food Safety** 9(2); 1988; 73-82

The influence of the microbial contamination load (x1) and preservative concn. (x2), as predictor variables, on the percentage of vials with growth of **B. pumilus** spores (y) was studied. The effect of a wide range of spore loads (1-500,000 spores of **B. pumilus** per samples) and preservative (chlorhexidine acetate) concn. (0.03-40 μ g/ml) on the percentage of contaminated samples was determined. Each contamination load was studied by adding the specified number of spores to vials containing various concn. of chlorhexidine dissolved in 2 ml of nutrient broth. Every level of spore and chlorhexidine concn. was represented by 50 or 100 vials. Curves representing the number of contaminated vials against the concn. of chlorhexidine were sigmoidal in shape and the data showed an indirect relationship. Data were analyzed by the regression analysis which revealed a significant correlation ($R = 0.83$) with the regression equation: $Y = 25.15 + 8.39 \log (x1) - 36.23 \log (x2)$. **AS**

Stabilizers

Gums

Xanthan gums

563 Ramirez (ME), Fucikovsky (L), Garcia-Timenez (F), Quintero (R) and Galindo (E). Xanthan gum production by altered pathogenicity variants of **Xanthomonas campestris**. **Applied Microbiology and Biotechnology** 29(1); 1988; 5-10

Several morphologically different isolates of **Xanthomonas campestris** cv. **Campestris** were obtained by treatment with N-methyl-N'nitro-N-nitrosoguanidine. These variants were used to infect Brassica plants where several degrees of virulence were found. The strains were cultured in order to produce polysaccharide, which was recovered by precipitation and subjected to physical and chemical characterization. A relationship was noted between virulence and parameters such as the final viscosity of the culture, the viscosifying capacity of the polymer and the amount of acetyl substituents in the gum. Infrared spectral analysis revealed that intramolecular interaction of gum constituents could play a significant role in virulence. It is suggested that the degree of virulence could be used as a criterion for selecting and isolating producers of high quality xanthan gum. **AS**

Whipping agents

564 Kroll (J), Gassmann (B), Dahme (A) and Hahnemann (H). Foaming properties of protein based whipping agents. New characteristics. **Nahrung** 32(1); 1988; 79-81

Sweeteners

Aspartame

565 Copestake (P). Aspartame-A bit of a headache. **Food and Chemical Toxicology** 26(6); 1988; 571

CEREALS

566 Kroll (J), Giersch (Ch) and Guth (S). Screening method for determination of trichothecenes type A and B in cereal and cereal products. **Nahrung** 32(1); 1988; 75-77 (De).

567 Taufel (A) and Emmer (I). Determination of the proteinase activity in cereals and flour. **Lebensmittelindustrie** 35(1); 1988; 31-33

The method of the more effective analysis of the proteinase activity in cereals by Folin-Ciocalteau reagents is described. It is based on the application of denaturated hemoglobin as substrate and a shorter incubation period. Special importance is given to the sample preparation and to the analysis in suspensions as well as in extracts. Its realization with shots, flours, malt flours and dough improvers is simplified and sufficiently exact. AS

Barley

568 Henry (RJ). Changes in Beta-glucan and other carbohydrate components of barley during malting. **Journal of the Science of Food and Agriculture** 42(4); 1988; 333-341

Changes in total (1-3), (1-4) Beta-glucan content were followed during the micro-malting of nine var. of barley with a wide range of malting qualities. These changes were related to estimates of endosperm modification based upon staining with Calcofluor. Beta-Glucan content declined from an average of 3.54% in the barley to 0.75% in the malt. Pentosan and total starch (including starch-derived oligosaccharides) levels showed comparatively little change during malting. Beta-Glucan composition of the barley was a poor indicator of malting performance. However, the Beta-glucan, starch and xylose contents of the malt all showed significant correlations with malt extract. Estimation of malt Beta-glucan content gave the best indication of malt quality. Direct detn. of Beta-glucan may be of more value in assessing malt quality than indirect techniques based upon assessing modification of stained grains. AS

569 Schwarz (WH), Schimming (S) and Stauden baner (WL). Degradation of barley beta-glucan by endoglucanase C of **Clostridium thermocellum. Applied Microbiology and Biotechnology** 29(1); 1988; 25-31

Endoglucanase C encoded by the celC gene of **Clostridium thermocellum** has been purified to homogeneity from a recombinant **Escherichia coli** strain. It was found that this enzyme is highly efficient in degrading glucans with alternating Beta-1, 4- and Beta-1, 3-linkages but lacks activity on unmodified cellulosic substrates. The properties of endoglucanase C were compared to those of **Bacillus subtilis** Beta-glucanase, an enzyme used in the brewing industry for Beta-glucan degradation. Both enzyme cause a rapid decrease of the viscosity of barley Beta-glucan as a result of internal chain cleavage. Endoglucanase hydrolyses non-specifically Beta-1, 3- and Beta-1, 4-bonds adjacent to unsubstituted or 4-O' substituted cellobiose units. Due to its lower pH optimum and increased thermostability endoglucanase C compares favourably with **B. subtilis** Beta-glucanase and seems suitable for use in the mashing process of beer brewing. AS

Rice

570 Chauhan (GS), Verma (NS) and Bains (GS). Effect of extrusion processing on the nutritional quality of protein in rice-legume blends. **Nahrung** 32(1); 1988; 43-47

The effect of extrusion processing using Wenger X-5 extruder on the quality of products of rice-legume (75:25) blends was investigated. The products were palatable and had a good texture. The nutritional quality of protein in the extrudates was significantly improved. The protein efficiency ratio values of rice-soybean, rice-Bengal gram and rice-blackgram products were: 2.25, 2.30 and 2.28 as compared to 2.10, 1.89 and 1.98 for the respective raw blends. Extrusion processing reduced the phytates in the products to the extent of 20.3 to 26.8%. AS

571 Ohtsubo (K), Nakagahra (M) and Iwasaki (T). Utilization suitabilities of new endosperm characters of rice strains. **Journal of Japanese Society of Food Science and Technology '(Nippon Shokuhin Kogyo Gakkaishi')** 35(9); 1988; 587-594 (Ja).

572 Ramadevi (P), Subramanyam (K), Krishna Rao (V) and Chiranjeevi (V). Effect of some dried leaf powders on grain mycoflora and viability of rice during storage. **Bulletin of Grain Technology** 26(2); 1988; 137-145

Screening of seven leaf powders of commonly occurring plants at 1 and 2% levels for their antifungal activity against stored grain mycoflora of rice was carried out by two techniques viz. moist blotter and agar plating. It was found that leaf powder of Datura stramonium reduced rice mycofloras significantly followed by **Eucalyptus** sp., **Nicotiana tobaccum, Vinca rosea,** Ocimum sp. and **Mangifera** indica. **Azadirachta indica** leaf powder was least effective against mycoflora. Grain viability was not affected by these treatments. NGKR

573 Takeda (M) and Nakazato (A). Production of fumaric or lactic acid by aeration culture of genus Rhizopus in medium of polished rice. Utilization "of the cultivated liquid of **Rhizopus** sp." in sake making (Part I). **Journal of Japanese Society of Food Science and Technology '(Nippon Shokuhin Kogyo Gakkaishi')** 35(9); 1988; 604-609 (Ja).

On application of fumaric or lactic acid in sake making, we studied aerating culture of genus **Rhizopus** in a liquid medium containing polished rice. The following medium for acid production was established the liquid medium consisted of 9% polished rice (polished rate of 75%), 0.1% potassium dihydrophosphate $MgSO_4$ $7H_2O$ 0.05% , and $CaCl_2$-$2H_2O$ 0.05%. After 240 g of rice and 264 l of additional minerals water in a jar fermentor (5 l) was sterilized for 15 min at 120 C, the culture was inoculated with **Rhizopus** spp. and incubated under the aeration of 4.0 l/min and 1200 rpm, for 4 days at 30 C. The cultivation of **R. javanicus** TUA 055 provided acidity of 22-24 ml, fumaric acid 10 111-12 327 p.p.m. succinic acid 2 008 -2 478 p.p.m., malic acid 1 193-1706 p.p.m., Alpha-keto-glutaric acid 732-925 p.p.m. and lactic acid 133-486 p.p.m. In the case of R. tonkinensis TUA 192, acidity of 20.0 ml lactic acid 14 671 p.p.m., malic acid 124 p.p.m., succinic acid 77 p.p.m. and citric acid 27 p.p.m. were obtained. These results were almost the same as those of shaking culture. AS

574 Unnikrishnan (KR) and Bhattacharya (KR). Application of gel consistency test to parboiled rice. **Journal of Food Science and Technology, India** 25(3); 1988; 129-132

Mobility of an alkaline rice-flour gel increased upon parboiling of the rice and with increasing severity of parboiling. Gel mobility of variously parboiled samples in a var. increased with increasing concn. of alkali, finally reaching a common values for all samples (including raw rice of the same var.), but then again seemed to diverge among processing conditions in a reverse order with further rise in alkali strength. Gel mobility was proportional to the room-temp. hydration power of whole-grain rice as well as to sediment vol. of an aqueous flour dispersion, the proportionality among processing conditions being identical in different var. Gel mobility appeared to be related only to the degree of starch gelatinization, unaffected by starch reassociation, and hence could be a good test for the extent of gelatinization in parboiled rice. AS

Wheat

575 Giner (SA) and De Michels (A). Evaluation of the thermal efficiency of wheat drying in fluidized beds. Influence of air, temperature and heat recovery. Journal of **Agricultural Engineering Research** 41(1); 1988; 11-23

Based on predicted drying and cooling times the thermal efficiency of wheat drying in continuous fluidized beds with and without air recirculation were evaluated. Fixed conditions with which simulation runs performed were: superficial air velocity -1.2 m/sec; initial and final grain moisture -25 and 15% (dry basis) resp.; initial grain temp. -10 C; final grain temp. -62 C; ambient condition temp. 20 C, absolute humidity -0.01 kg/kg and atm. pressure; 101234 Pa. Bed height was varied from 0.1 meter to 0.3 meters. Use of air temp. approaching 100 C in the first drying zone made possible efficiency increase of about 15% with reference to the basic case i.e., drying with no recirculation and constant temp. at the bed inlet. An algorithm was developed which allows the calculation of the recirculated fraction of the outlet air. Recirculation of the drying air lead to an increase of efficiency from 28% to 55%. An extension of the algorithm also made possible the calculation of the heat supplied by the air used to cool the grain, when it is added to the stream of recirculated air from the previous drying stage the efficiency rose to about 64%. RS

576 Hira (CK), Sadana (BK), Mann (SK), Anita Kochhar Jasbir Kanwar Harjit Sidhu). Changes in chemical constituents of wheat stored in different storage structures. Bulletin of Grain Technology 26(2); 1988; 109-116

Storage studies on 60 samples of wheat stored in different storage structures collected from eight villages in Ludhiana District of Punjab at intervals of 1, 5 and 11 months of storage after harvest have been carried out by detn. of crude fibre, neutral detergent fibre, free fatty acids, non protein N and uric acid. The results showed that all the above constituents increased significantly with storage time except gluten content and in vitro protein digestibility which decreased. It was also seen that crude protein increased upto 5th month of storage but decreased by the end of 11th month. The traditional method of storage of wheat in wheat bags kept in wheat straw compared well with modern methods of storage like bin storage or jute bags with polythene lining. Max. damage occurred in wheat stored in jute bags. NGKR

577 Horabik (J) and Molenda (M). Force and contact area of wheat grain in friction. Journal of Agricultural Engineering Research 41(1); 1988; 33-42

Panda var. of wheat grains having a moisture content of 11% (w.b) and size greater than 3.5 mm were used in this study. Measurements of fricition coeff. and true contact area of grain pairs on a glass plate were carried out. The contact area of grain with the plate was measured by applying the technique of microphotography in reflected light. Normal contact forces in a range from 0.029N to 4.30N were applied on the grain for the measurement of tangential force. The tangential force measuring device was used for this purpose. The results showed that the friction coeff. was 0.0661 for mealy grain and 0.0508 for vitreous grain. The contact area was also larger for mealy grain than for vitreous grain. The removal of cutin from the grain surface resulted in an increase of the friction coeff. which was attributed to the lubricating action of cutin. Hertz formula fitted well for the relation between the contact area and normal force upto 1.5N. RS

578 Lorenz (K) and Meredith (P). Insect-damaged wheat. History of the problem, effects of baking quality, remedies. Lebensmittel-

Wissenschaft und-Technologie 21(4); 1988; 183-187

Review. 26 references. BV

579 Pankaj Moona.. Wheat germ (Lecture). **Indian Miller** 19(1); 1988; 16-19

Wheat flour

580 Bagley (EB), Christianson (DD) and Martindale (JA). Uniaxial compression of hard wheat flour dough. Data analysis using the upper convected Maxwell model. Journal of **Texture Studies** 19(3); 1988; 289-305

581 Salovaara (H), Kerojoki (H), Demeczky (M) and Vamos-Vigyazo (L). High amylase flour in baking with very high frequency (VHF) energy. **Acta Alimentaria** 17(1); 1988; 67-76

Doughs prepared from wheat flour of a moderate and of high alpha-amylase activity (falling numbers 197 and 94, resp.) were baked with very high frequency (17.7 MHz) energy in order to study the possibilities of breadmaking from sprout-damaged wheat. In a conventional baking procedure, high amylase flour produced loaves with doughy and sticky bread crumb properties. These defects were avoided by a two-phase process of high temp. conventional heating (5 min at 350 C) which was required for crust formation. The positive results were further confirmed and shown increased in the dough. Excessive malt additions to flour (falling number 62), however, caused doughy and sticky crumb in spite of the high frequency treatment. The two-phase baking procedure (high frequency treatment followed by high temp. treatment) took approx. 10 min compared to the 30 min required for the conventional baking procedure. Baking losses due to extensive water evaporation, however, were as high as 21% indicating that problems may arise from an improperly controlled two-phase baking procedure. AS

582 Shehata (NA), Darwish (N), El-Natry (F) and Abdel Razek (FA). Supplementation of wheat flour with some local legumes. **Nahrung** 32(1); 1988; 3-8

Egyptian bread made with broad bean flour, lentil flour, and wheat flour was scored for aroma, crust colour, crumb colour, texture, flavour and over-all acceptability by Egyptian judges. Protein quality of the bread was measured by a rat growth study. Analysius of variance for the data from the organoleptic evaluation was insignificant. The results indicate that broad bean flour could be added to wheat flour in making Egyptian Ballady bread up to 20% without affecting any of the tested characteristics. However, supplementation of wheat flour with more than 15% lentil flour might have some effect on flavour and hence on overall acceptability. The addition of 5, 10, 15 and 20% broad bean flour and lentil flour was accompained by an increase in the PER. It was clear that wheat flour supplemented with broad bean flour had a more pronounced effect on the PER at a 5 and 10% level of supplementation than that supplemented with lentil. The PER data were subjected to analysis of variance. At 1% level of significance the increase in PER for the 10, 15 and 20% broad bean breads was significant. Also the differences in the PERs between 5, 10 and 15% broad bean flour was significant. At 1% level of significance there was a significant difference in the PER values of bread made with 15 and 20% lentil flour. Incorporating broad bean flour into bread at a 20% level had a significant effect on the NPR at 1% and 5% level of significance. At 1% level of significance the only significant increase in NPR was noticed using the 20% level of lentil flour. AS

Wheat products

583 Robert (P), Bertrand (D) and Devaux (M-F). Classification of milled wheat products according to their purity by multivariate analysis of near infrared spectroscopy. **Sciences des Aliments** 8(1); 1988; 113-131 (Fr).

The assessment of milled wheat product purity by the standard ash test has been widely criticised. The near infrared reflectance spectroscopy is an analytical method that makes it possible to predict the degree of contamination of starchy endosperm by the outer layer of the kernel. The purpose of the present paper is to find a spectral infromation that is characteristic of purity. A new mathematical treatment is tested to determine the quality of milled products without any chemical reference data. The mathematical treatments used in this study, correspond to multivariate statistical analyses. Principal component analysis is used to draw graphical representations that describe resemblances or differences among spectra, and to define, spectral patterns. A classification of the spectra according to the ash and the protein content is observed on the graphical representations. The wavelengths that are characteristics of protein, are identified on the corresponding spectral pattern. The spectral pattern of ash shows peaks that can be assigned to protein, cellulose and oil. A classification of the milled products according to their purity and without chemical reference data, is performed by means of a procedure that is similar to a discriminat analysis. The procedure is applied to wavelengths that correspond to filters of a routine apparatus. The degree of contamination of the products is evaluated by the wavelength at 2 100 nm that is characteristic of starch. AS

Wheat proteins

Gluten

584 Kim (JJ), Kieffer (R) and Belitz (HD). Rheological properties of wheat gluten, containing different amounts of prolamins from various cereals. **Zeitschrift fur Lebensmittel-Untersuchung und -Forschung** 186(1); 1988; 16-21 (De).

Lyophilized wheat gluten was fractionated into prolamins (33.9%) and glutelins (66.1%) by extraction with 70% aqueous ethanol. Modified glutens, with the prolamin content between 22% and 56%, were obtained by the addition of varying amounts of the above mentioned fractions to the original gluten. Load-extension tests were performed directly with the modified glutens and showed a strong decrease in resistance up to a factor of 20 with increasing prolamin content and a corresponding increase in extensibility up to a factor of 2.5. The influence of the addition of prolamins (20%-50%) from other cereals (maize, barley, sorghum, oats, rye) on the properties of wheat gluten depends upon the average hydrophobicity of these proteins, with the exception of barley prolamin. Wheat gluten is strengthened by the relative hydrophobic maize prolamin but weakened by the other prolamins. The shear modulus G' of gluten was measured by high-pressure capillary viscosimetry. The decrease of G' with increasing amounts of added wheat prolamin indicated a decrease in elastic deformability. The results of micro-baking tests, performed with recombined flours on the basis of the addition of 50% of prolamins from the different cereals to wheat gluten, were in accordance with the rheological behaviour of the corresponding glutens. AS

Wheat starch

585 Lorenz (K) and Meredith (P). Insect-damaged wheat. Effects on starch characteristics. **Starch/Starke** 40(4); 1988; 136-139

Insects (**Calocoris, Sidnia** and **Nysius**) which has been in contact with wheat flowering until full grain maturity under controlled conditions caused only minor effects on kernel wt. There were no obvious detrimental effects on physicochemical properties of isolated starch and except for volume, which was slightly, lowered, bread baking potential of the starches was excellent. A commercial insect-damaged wheat samples (insect not identified), however, gave lower falling number and starch with poor baking qualities. SZA

MILLETS

586 Clemente (E) and De Borja Portela (F). Effect of sodium lauryl sulphate in solubilizing protein for tryptophan determination. **Journal of Food Biochemistry** 12(1); 1988; 61-68

The detn. of tryptophan is usually carried out after the solubilization of proteins in corn and sorghum using sodium lauryl sulphate (NaLs) in a basic medium . The experimental design evaluated different levels of NaLs and NaOH at various temp. and times. The samples were dried, ground and defatted prior to treatment and these were hydrolysed and tryptophan was estimated using spectrophotometer at 565 nm with casein as control and DL-tryptophan as standard according to Beer's law. The results showed that NaLS was found to be very effective in solubilizing corn and sorghum protein for subsequent tryptophan detn. NGKR

Corn

Corn starch

587 Kume (T), Rahman (S) and Ishigaki (I). Change in digestibility of gamma-irradiated starch by low temperature cooking. **Starch/Starke** 40(4); 1988; 155-158

Irradiation of corn starch enhanced its digestibility by glucoamylase after cooking at low temp. AT 25KGY the required cooking temp. was decreased from 75-80 to 65 C. The digestibility of potato starch, which has a high viscosity was specially enhanced at low temp. cooking as viscosity reduced markedly upon irradiation. Gelatinization of starches upon irradiation was enhanced in the case of corn, potato, sweet potato and wheat starches but not in the case of tapioca starch. The results indicated that irradiation of starches is useful not only for the sterilization of broth for fermentation but also for the enhancement of its digestion. SZA

588 Takeda (Y), Suzuki (A) and Hizukuri (S). Influence of steeping conditions for kernels on some properties of corn starch. **Starch/Starke** 40(4); 1988; 132-135

The steeping conditions for kernels affected the physicochemical properties of corn starch. Alkaline steeping produced starches with low nitrogen and lipid contents and extremely low P contents as compared to water and sulphite solution steeping. The latter produced starches with slightly lowered swelling power and solubility. Steeping at low temp. in water produced starch showing lowest pasting temp. on amylography, but showed similar gelatinization temp. on photopastegraphy as compared to other starches. SZA

Kodo millet

589 Sudharshana (L), Vincent Monteiro (P) and Geeta Ramachandra). Studies on the proteins of kodo millet (**Paspalum scrobiculatum**). **Journal of the Science of Food and Agriculture** 42(4); 1988; 315-323

Studies on the proteins of 5 var. of kodo millet showed that there are hardly any varietal differences. Fractionation of the proteins showed that glutein is the major storage protein. The amino acid compositions of the protein of the 5 var. of kodo millet and the individual protein fractions of two var. were determined. Lysine is the most limiting amino acid followed by methonine and cystine. There is no significant negative correlation between lysine levels and protein content. Sodium dodecylsulphate polyacrylamide gel electrophoresis patterns indicate great similarities in the different var. AS.

PULSES

590 Anjana Agarwal, Sone Lal and Gupta, (KC). Natural products as protectants of pulses against pulse beetles. **Bulletin of Grain Technology** 26(2); 1988; 154-164

This review presents the information on the use of natural products as protectants of pulses against pulse beetles. The natural products such as non-toxic protectants, plant powders, plant extracts, vegetable oils, essential oils and oil vapours, were dealt in the review. 65 references. NGKR

591 Swarooparani (K) and Vimala (V). Efficacy of tricalcium phosphate as prestorage treatment of pulses stored in different bags. **Bulletin of Grain Technology** 26(2); 1988; 146-153

The efficacy of tricalcium phosphate as a prestorage treatment for green gram to prevent storage losses was tested in closely knit jute bag, plasticised jute bag and coaltar coated jute bag during six months storage. It was seen that moisture increased with increase in insect infestation in untreated samples. Whereas tricalcium phosphate treatment decreased the moisture during storage and correlation was observed between increase in uric acid and decrease in % viability with degree of infestation. Plastic bag was found to be the best and cheapest for preventing infestation and 0.5% tricalcium phosphate treatment was the best in preventing infestation. NGKR

Beans

592 Katiyar (SK) and Bhatia (AK). Lipid characteristics and phospholipid composition in some beans of Kashmir valley. **Journal of Food Science and Technology, India** 23(3); 1988; 165-166

Commonly consumed legumes viz. **Phaseolus vulgaris, Vicia faba** and **Vigna auriculata** of Kashmir valley have been analysed for their phospholipid composition. The beans contain 1.9-2.5% lipids of which phospholipids constitute 35-55%. Phosphatidyl ethanolamine, the major component, varies from 30-53% of the total phospholipids. The major fatty acids (%) are: 16:0, 16-23; 18:1, 11-18; 18:2, 24-30 and 18:3, 18-35. AS

Cowpeas

593 Safa-Dedeh (S) and Yiadom-Farkye (NA). Some functional characteristics of cowpea (**Vigna unguiculata**), bambara beans (**Voandzeia subterranea**) and their products. **Canadian Institute of Food Science and Technology Journal** 21(3); 1988; 266-270

Cowpeas (**Vigna unguiculata**) and bambara beans (**Voandzeia subterranea**) are important legumes in the diets of Ghanaians. The characteristics of the seed, flour and protein isolates were studied. The initial rate of water absorption was significantly lower in the

var. with the thicker seed coats. In general, the protein isolates
were found to possess better foaming and fat absorption properties
than the flours. Cowpea products were found to possess better func-
tionality than the bambara beans. AS

Lupins

594 Kaffka (KJ). Determination of amino acids in lupine by near infrared
reflectance spectroscopy. **Acta Alimentaria** 17(1); 1988; 3-11

Preliminary studies were carried out to determine if NIR spec-
troscopy could be used to estimate the concn. of amino acids in
lupine. Seventeen amino acids were analyzed in the lupine calibration
samples. The chemical analyses were performed with an ion exchange
amino acid analyzer type OE 914 Aminochrom II. The log (1/R) spectra
of the ground lupine samples were obtained and recorded in the 1100-
2500 nm wavelength range on the NEOTEC (Pacific Scientific) Research
Composition Analyzer, Model 6450. The relationship between concn.
data and values of the second derivative spectra measured at differen
wavelengths was determined by multiple linear regression analysi
using two different equation forms (two mathematical models). Result
as characteristic wavelengths, multiple correlation coeff. standar
errors of calibration and coeff. of variability for seventeen amin
acids in lupine For lysine, isoleucine and threonine (limitin
acids) the correlation coeff. were around 0.85 the SEC values aroun
5.5. The higher CV value for methione detn. may be related to th
inherent higher error of methione analysis by ion exchange chromatog
raphy due to hydrolysis losses. These results prove that NI
technique can be used as a rapid, non-destructivemethod for determin
ing the amino acid concn. in lupin. AS

595 Wittig de Penna Castro (X), Cerda (P), Ballester (D). Sensory quali
and acceptability of "hallulla" and "marraqueta" breads supplement
with sweet lupine flour (Lupinus albus, cv. Multolupa). **Revista**
Agroquimica y Tecnologia de Alimentos 28(1); 1988; 127-134 (Es).

The effect of the addition of 6, 9 and 12% of sweet lupine flo
(SLF) to the wheat flour on the sensory quality and acceptability
two types of common Chilean breads ("hallulla" and "marraqueta") w
studied. Overall quality of breads with 6% SLF did not differ sign
ficantly from that of breads without SLF. The 9% level also show
acceptable results. A very good acceptability by 9-10 yr. old sch
lars was found for the three addition levels. No variation w
observed during the 5 days replicates performed. Based on the fo
nutritional quality of bread with SLF, found in previous works, a
its good sensory quality, the addition of 6 or 9% SLF is recommende
Attention should be paid to the control of alkaloids level in SLF f
human feeding; the flour used in this work contained 0.09% total al
loids, expressed as lupanine. AS

Pigeon peas

596 Srivastava (S), Mishra (DP) and Khare (BP). Effect of ins
infestation on biochemical composition of pigeon pea (**Cajanus ca**

(L) Millsp.) seeds stored in mud bin. **Bulletin of Grain Technology** 26(2); 1988; 120-125

Pigeon pea (Cajanus cajan (L) Millsp) seeds stored in mud bins for 12 months after artificial infestation with **Callosobruchus chinensis** were assessed for biochemical constituents. Seed moisture, total ash, crude fibre, crude protein and reducing sugar increased with increasing infestation and storage time. However, crude fat, total carbohydrate and non-reducing sugars decreased with storage period. NGKR

Rice beans

97 Hira (CK), Kanwar (JK), Gupta (N) and Kochhar (A). Cooking quality and nutritional evaluation of the rice-bean (**Vigna umbellata**). **Journal of Food Science and Technology, India** 23(3); 1988; 133-136

Five var. of rice bean were tested for cooking quality and compared with common var. of green gram, black gram and cowpea. All the var. were also analysed for their nutritional quality i.e., protein, total sulphur, S-containing amino acids, lysine, Ca and Fe, phytin, phosphorus, phenols and in vitro digestibility of proteins. The results indicated that nutritional quality and acceptability of rice bean were comparable to other commonly consumed pulses. AS

OILSEEDS AND NUTS

98 Agarwal (YC), Tikkoo (AK), Singh (BPN) and Maharaj Narain. Post-harvest technology of oilseeds. Problems and perspectives. **Bulletin of Grain Technology** 26(2); 1988; 99-108

The various aspects covered in the review include present potential and production of oil; process status technology for oil recovery; estimated oil loss through cattle feed and the strategies to be adopted to set-up oil production at the present level of availability. 12 references. NGKR

99 Shehata (NA), El-Nahry (F), Darwishn (N) and El-Shewy (MA). Comparative studies of some local oil seeds and seed cakes. **Nahrung** 32(1); 1988; 9-14

Rapeseeds

00 Patil (BG) and Ward (GT). Resistance to airflow of oilseed rape. **Journal of Agricultural Engineering Research** 41(1); 1988; 25-31

Rapeseed of Tower var. at an average moisture content of 7% (w.b) was conditioned to six. levels of moisture 19.6, 17.6, 15.5, 11.9, 8.83, and 6.46% (W.b) before testing. The experimental apparatus consisted of a sample holding bin with provision to vary air flow in the range of 0.17 to 0.32 m/s and to measure air pressure at different depths for each airflow employed. Results showed that resistance to airflow increased rapidly with increase in airflow but decreased with an increase in moisture content of rapeseed. A multiple regression equation was fitted to predict pressure drop in the range tested as a function of airflow and moisture content. RS

601 Schwenke (KD), Augustat (D) and Bock W). Rapeseed protein-polyanion interactions. Binding of pectic acid to the main rapeseed protein fractions in insoluble complexes. **Sciences des Aliments** 8(1); 1988; 97-112

The binding of pectic acid (PA) to the main proteins from rapeseed, the high mol. neutral 12 S globulin and the low mol. basic protein fraction (albumin), in insoluble complexes at pH lower than protein has been studied using turbidimetric titration and chemical analysis of the supernatant after coprecipitation. An intensive binding of PA to both proteins takes place between pH 5 and 3, which corresponds to the region of titration of carboxyl groups in both macroions. A (1:1)-stoichiometry of the PA-protein ratio was found by turbidimetry to exist at pH 3.3-3.4 for the globulin and at pH 4.2-4.3 for the albumin. At lower pH an excess binding of PA to both proteins was found. A partial solublization by an excess of PA takes at low and high pH. The complete precipitation pf tje globulin occurs already with a subsoichiometric amount of PA at pH 3.0-4.5. Increasing the amount of PA over a large range results in an excess PA binding to the copreicpitate, while the precipitation yield of the protein remains unchanged. A complete precipitation of the albumin only takes place at low pH (lesser than or equal to 4). In the pH range 6-9 the PA-albumin ratio in the coprecipitate is constant (0.11), while the protein precipitation yield decreases from 88% to 58%. The albumin precipitation yield decreases with increasing protein concn. at pH 9. AS

Soybeans

602 Abbas (J), Rouet-Mayer (M-A), Tremolieres (A) and Philippon (J). Chlorophyll alpha bleaching by soybean lipoxygenase type 1 effect of different oxygen concentrations. **Sciences des Aliments** 8(1); 1988; 83-96 (Fr).

Soybean lipoxygenase 1, with linoleic acid, catalyses the bleaching of chlorophyll Alpha. The rate of chlorophyll Alpha bleaching increases when the oxygen concn. decreases in the reaction mixture. But in anaerobic iiconditions chlorophyll bleaching is much lower than in non-saturated air conditions. In anaerobic conditions, the addition of preformed hydroperoxides results in an increase in the bleaching of chlorophyll Alpha. Based on these results we conclude that linoleic acid radicals react directly on the pigment bleaching. AS

603 Flegel (TW). Yellow-green **Aspergillus** strains used in Asian soybean fermentations. **ASEAN Food Journal** 4(1); 1988; 14-30

The characteristics and use of yellow-green **Aspergillus** strains in koji fermentations have been reviewed. MVG

604 Gunasekaran (S), Cooper (TM) and Berlage (AG). Soybean seed coat and cotyledon crack detection by image processing. **Journal of Agricultural Engineering Research** 41(2); 1988; 139-148

The objectives were to determine optimum conditions for acquiring video images of soybeans using a computer vision system and to develop image processing algorithms to detect soybean seed coat and cotyledon cracks. Two soybean var. Williams and Delaware were used in the exp. White light, in the front lighting made with a black background was the best condition for acquiring video images of soybeans suitable for image processing. Image processing algorithms were developed to detect both seed coat crack and cotyledon cracks in soybeans using the software supplied with the vision system computer. Seed coat and cotyledon crack detection was most successful when seeds were properly oriented towards the camera using the algorithms developed. Ninety six % soybeans with seed coat cracks and 100% of the soybeans with cotyledon cracks were correctly detected from the samples tested. RS

605 Wassef (EA), Palmer (GH) and Poxtan (MG). Protease digestion of the meals of ungerminated and germinated soybeans. **Journal of the Science of Food and Agriculture** 44(3); 1988; 201-214

Proteolytic activities of papain and trypsin on soy meal were increased after the meals were defatted or prepared from germinated soybeans or digested for long periods. Germination and seeding growth of soybeans were accelerated by impaction, soaking in water and growth at a temp. of 30 C. Seeding growth repressed the inhibitors of the protease activities in the cotyledons and induced the development of high levels of alpha-amino nitrogen. Scanning electron microscopy, confirmed that protein bodies were degraded extensively during seedling growth of soybeans, whereas lipid degradation was restricted. The undegraded cell walls of the cotyledons may also limit protease digestion of soy meal in vitro. AS

Subabul

606 Azeemoddin (G), Jaganmohan Rao (S) and Thirumala Rao (SD). Amino acid composition of subabul (**Leucaena leucocephala**) seed kernel proteins. **Journal of Food Science and Technology, India** 25(3); 1988; 158

Subabul seed, its kernels and deoiled kernel flour show crude protein contents of 27.5, 55.0 and 60.0% resp. The deoiled kernel flour is fairly rich in several essential amino acids. AS

Walnuts

607 Jan (M), Langerak (DIs), Wolters (GTh), Farkas (J), Kamp (HJVD) and Muuse (BG). The effect of packaging and storage conditions on the keeping quality of walnuts treated with disinfestation doses of gamma rays. **Acta Alimentaria** 17(1); 1988; 13-31

Shelled walnuts were packed in polyethylene and laminated foil (PVDC-polyethylene) pouches as well as cans, under nitrogen or air atm. The packaged samples were irradiated with a dose of 0. 0.5, and 1.0 kGy, resp., and stored up to 4 months at 5 , 20, or 40 C. Peroxide and p-anisidine values and free fatty acid content were followed during storage to record changes in the lipids of the nuts. Retention of tocopherols was estimated directly after irradiation and after 8 wks of post-irradiation storage. Also the nuts were scored by a panel qualities or the indices of lipid oxidation. No significant differences were found in the content of tocopherols between untreated and irradiated samples. At 40 C, the sensory quality decreased fast and the nuts became inedible within 2 months. At 5 C, the nuts could be stored for more than four months. Nuts packed under nitrogen kept their organoleptic quality better than nuts packed under normal air, particularly at 5 C. Polyethylene was not a satisfactory packaging material for shelled walnuts. Packaging in cans gives a much better result, laminated foil can also be used. The peroxide and p-anisidine values as well as the free fatty acid content increased faster for nuts stored at 40 C, compared to nuts stored at 5 C and 20 C. Also nuts stored with nitrogen had lower peroxide and p-anisidine values and free fatty acid content. AS

TUBERS AND VEGETABLES

608 Dalal (VB) and Nagaraja (N). Protective coats for fresh fruits and vegetables. **Indian Food Industry** 7(4); 1988; 4-11

This paper deals with the role of waxes, resins, oils and synthetic plastic materials as skin coatings for some fresh and healthy fruits and vegetables for extending their storage life both at ambient and low temp. Covers types of waxes (vegetable waxes, petroleum waxes, insect waxes, synthetic waxes, other waxes and resins, emulsions), technique of emulsification, different methods of application of wax coating to fruits and vegetables, mode of action of wax coating on fruit and vegetables and procedure for treating oranges at a rural centre from harvest to shipping (picking, inspection and gradings) waxing, packing in carton and stacking). BV

609 Nakamura (Y), Hasegawa (Y), Tonogai (Y), Hanafusa (M), Hirose (H), Taharasako (Y) and Ito (Y). Determination of ethylene dibromide in tropical fresh fruits using Dean-Stark apparatus and ECD-gas chromatography. **Journal of Food Protection** 51(9); 1988; 727-730

The concn of residual EDB (ethylene dibromide) in tropical fresh fruits imported to Japan were investigated using the Dean-Stark apparatus and ECD-gas chromatography (ECD-GC) i.e. EDB was distilled into a small amount of n-hexane using a Dean-Stark apparatus and determined by ECD-GC. Recovery of EDB added to papaya pulp at the concn. of 0.1 p.p.m. was more than 19.1% by the proposed method. The relationship between storage conditions and concn of residual EDB was investigated for mango pulps; it was clarified that EDB content in mango pulps decreased with the storage time at room temp. (25 C) and refrigerated (7 C) but the content did not decrease for 6 d at -20 C. Survey of the concn of residual EDB in pulps, peels and seeds of the fresh fruits (grapefruits, papayas, mangos and litchis) imported to Japan in 1987 separately was conducted. Extremely high concn of EDB were found in the seeds of grapefruits. A similar trend was also observed in other fruits. AS

Root vegetables

Beet

610 Merodio (C) and Sabater (B). Preparation and properties of a white proteins fraction in high yield from sugar beet (**Beta vulgaris L.**) leaves. **Journal of the Science of Food and Agriculture** 44(3); 1988; 237-243

Chlorophyll-free protein has been recovered at a yield in excess of 50% from sugar beet (**Beta vulgaris L**) leaf juice after two successive pH treatments. This corresponds to about 60 kg of white protein per hectare. The main component of the final preparation is ribulose-1, 5-bisphosphate carboxylase (EC 4.1.1.39). Compared with the unfractionated protein from leaf extracts, the white protein preparation has higher contents of tyrosine, threonine, glutamic acid and proline and lower ones of isoleucine, lysine (although still high: 76 mg g^{-1}) and glycine. The content of methionine is high (24 mg g^{-1}) probably as a result of the addition of sulphite during protein extraction. The white protein preparation has a low level of ether extractives (17 mg g^{-1}) and a moderate ash (52 mg g^{-1}) content. The white protein is rapidly degraded by pepsin, trypsin and pancreatic juice. AS

Root crops

611 Bradbury (JH). The chemical composition of tropical root crops. **ASEAN Food Journal** 4(1); 1988; 3-13

Results obtained in a collaboration program on study of the chemistry and nutrition of tropical root crops involving workers from nine countries of the South Pacific including Australia, have been summarised and compared with the results of workers from other countries. An important general conclusion is that there are very few differences between the chemical composition of particular root crops obtained from different parts of the world. MVG

Tubers

Jerusalem artichoke

612 Zawistowski (J), Biliaderis (CG) and Murray (ED). Purification and characterization of Jerusalem artichoke (**Helianthus tuberosus L.**) polyphenol oxidase. **Journal of Food Biochemistry** 12(1); 1988; 1-22

Polyphenol oxidase (EC 1.14.18.1) has been purified from Jerusalem artichoke tubers by immobilized copper affinity chromatography. The enzyme is primarily an o-dihydroxyphenol oxidase with apparent Km values of 1.9, 3.5 and 3.9 mM for chlorogenic acid, 4-methylcatechol, and catechol, resp. Several compounds exhibited inhibitory action for the enzyme in the order of sodium metabisulphite > sodium diethyldithiocarbamate > 2, 3-naphthalenediol > thioglycollate. Multiple forms were identified by gel filtration and SDS-gradient polyacrylamide gel electrophoresis; two aggregates with apparent MW of 120 and 86 K and two monomeric subunits of 40-42 and 32-34 K, resp. Concn. dependent association-dissciation phenomena most likely determine the multimeric state of this enzyme. While the aggregated forms exhibited specificity towards mono, di- and polyhydroxyphenols, the low MW subunits were found active only with o-dihydroxyphenols. The isoelectric points of the various enzyme species were within the range of 4.0 to 10.0. The enzyme was found to contain appreciable amounts of associated carbohydrate materials. AS

613 Zawistowski (J), Biliaderis (CG) and Murray (ED). Isolation and some properties of an acidic fraction of polyphenol oxidase from Jerusalem artichoke (**Helianthus tuberosus** L.). **Journal of Food Biochemistry** 12(1); 1988; 23-25

Potatoes

614 Canet (W) and Sherman (P). Influence of friction, sample dimensions and deformation rate on the uniaxial compression of raw potato flesh. **Journal of Texture Studies** 19(3); 1988; 275-287

615 Gorinstein (S), Yamagata (S) and Hadziyev (D). Electrophoretic separation of proteins and their amino acid composition in raw and processed potatoes. **Journal of Food Biochemistry** 12(1); 1988; 37-49

The fractionation and characterisation of proteins from raw and processed potatoes and amino acid detn. by ion-exchange chromatography and the differences of proteins in potatoes after processing have been reported in this paper. The 1.67% N/DM in potato tubers was found to be distributed in all anatomical regions of the tuber and of the total N content 43% was dialyzable -N and 32.9% protein-N. The protein by solubility fractionation provided 67% albumin, 23% globulin, 1.4% prolamin and 9% glutelins. As shown by SDS-PAGE the albumin had two major protein sp., one of 4.5 x 10^3 second of 12-25 x 10^3 daltons. It was also seen that prolamin and glutelins contained protein bands coinciding in mol. wt. with those of albumin and globulins. When amino acid analysis of proteins was determined by ion exchange column chromatography some minor losses in the protein composition of potatoes occured during processing. NGKR

616 Marwaha (RS). Nutritional composition of commonly cultivated potato varities. **Indian Journal of Nutrition and Dietetics** 25(1); 1988; 26-32

This reports the important chemical constituents of ten most commonly cultivated potato var. including the newly released ones. Ten potato var. grown at Central Potato Research Station, Jalandhar, were analysed for DM, starch content, reducing and total sugars, free amino acids and true protein, total phenols, orthodihydroxyphenols and tyrosine, total carotenoids and ascorbic acid. Results showed that DM content ranged between 15.4-23.1%, and starch from 12.3%-18.3%. Significant variations were seen in the contents of total carbohydrates, true protein, free amino acids, vitamin C and beta-carotene. It was found that Kufri Chamatkar var. had highest DM, max. starch and total carotenoids but low in free amino acids; Gulmarg Special var. had lowest starch and max. free amino acids and vitamin C. True protein was max. in Kufri Sindhuri var.; total phenols and tyrosine content was max. in Kurfi Jyoti var. Kurfi Chamatkar var. was found to be the best for high starch recovery. MVG

617 Ogunero (VW). Pectin esterase production by **Rhizopus stolonifer** from post-harvest soft rots of potato tubers in Nigeria and its activity. Nahrung 32(1); 1988; 59-65

The ability of **Rhizopus stolonifer** (Ehren ex. Fr.) Lind, a common pathogen of post-harvest potato tubers in Nigeria to produce cell wall-degrading enzymes was studied. When grown on a basal medium containing 0.5% (w/v) sodium polypectate at 30 C, only pectin esterase was detected in the growth medium throughout the incubation period of 10 days. Both exo- and endo-polygalacturonase activity were absent in the growth medium. The pectin esterase was found to be constitutive as it was radily produced on sources of carbon other than pectin. Partial purification was achieved by a combination of membrane filtration, ethanol precipitation, fractionation on DEAE-cellulose and gel-filtration on Sephadex G-200. This resulted in a single enzyme peak with specific activity of 58.5 and a recovery value of 4.9%. The purified enzyme was most active at pH 8.5 and a temp. of 35 C. It lacked the ability to macerate potato tissue cells and did not induce discolouration of potato discs nor kill the cells. **R. stolonifer** is discussed to be probably not strongly pathogenic to post-harvest potato tubers. AS

Sweet potatoes

618 Khalil (M), Hamza (MA) and Makki (MM). Chemical and nutritional assessment of sweetpotato proteins. Nahrung 32(1); 1988; 67-73

The solubility of sweetpotato nitrogen increased outside the pH range 3-6 for the pulp, and 2-5 for the peel of the two var. namely, "Abees" and "Giza 69". The min nitrogen extractability occurred between the pH range 3-4, and 4-5 for the peel and pulp, resp. The sweetpotato protein isolates were prepared separatly from both peel and pulp of the two var. The former had the highest values of carbohydrates and ash while the latter had the highest values of protein and fat. The in vitro digestibility of sweetpotato proteins and casein by pepsin-pancreatin was studied. Casein was more easly digested than the proteins of sweetpotatoes, whose digestibilities were higher in the pulp than in the peel of the two var. No trypsin inhibitor activity was detected in peel and pulp of both var. under test. The effect of the var. of sweetpotatoes on the protein patterns was studied using the polyacrylamide gel electrophoresis and varietal specific patterns were obtained. AS

619 Kukimura (H), Yoshida (T) and Komaki (K). New sweet potato cultivars, Benihayato and Satsumahikari, making a new turn for processing. Jour-

nal of Agricultural and Food Chemistry 22(1); 1988; 7-13

Yam

620 Ajibola (OO), Abonyi (BI) and Onayemi (O). The effect of some processing variables on the dehydration of pregelled yam pieces. Journal of Food Science and Technology, India 25(3); 1988; 117-120

The effect of size, blanching time and drying temp. on the drying characteristics of pregelled yam pieces were investigated using a 2^3 factorial exp. Page's model was adequate in describing the drying behaviour. Cassava pieces diced to 0.8 cm blanched for 20 min and dried at 70 C reached a safe moisture content of 10% (dry basis) in 12 h. AS

621 Samarajeewa (U), Suffiyan (MI) and Gunasena (HPM). Minerals and sapogenins of some yam species. ASEAN Food Journal 4(1); 1988; 38-40

622 Tanoue (H), Hobara (S) and Ishihata (K). Determination of viscous polysaccharide of yam (Dioscorea) by gel permeation chromatography and correlation of its content with mechanical characteristics of tororo. Journal of Japanese Society of Food Science and Technology '(Nippon Shokuhin Kogyo Gakkaishi') 35(9); 1988; 595-603 (Ja).

The rheological features of tororo (ground tuber of yam) are considered to be due to viscous polysaccharide contained in it. In this study, the polysaccharide content was determined by gel-permeation column chromatography using a line of three columns packed with Toyopearl HW-65, HW-75, HW-40 in order. The water extract of tororo applied on the column was fractionated successfully into a peak of viscous polysaccharide separated from other sugars and proteins. The recovery test using purified polysaccharide of yam resulted in 101.1% and it was confirmed that the chromatographic procedure was useful for detn. of viscous polysaccharide in yam. On tororo prepared from thirteen kinds of var., this chromatographic detn. of polysaccharide and also viscometric and tensile test for rheological properties were carried out, and the following results were obtained. (1) the polysaccharide content of yams examined here ranged from 126 mg% of Nagaimo to 911 mg% of Jinenjo. (2) The polysaccharide content was correlated with mechanical characteristics of tororo (B-viscometer and L, S and L x S values on the tensile test). Among these relationships, a correlation coeff. on L value reflecting spinnability of tororo showed high value, 0.870. On the basis of these results, it was found that Jinenjo, KaU-02, KaU-09, KaU-14 were preferable for processing purpose. AS

Vegetables

623 Herrmann (K). On the occurrence of flavonol and flavone glycosides in vegetables. Zeitschrift fur Lebensmittel-Untersuchung und -Forschung 186(1); 1988; 1-5

Flavonol and flavone glycosides occur in common vegetables, mainly as the quercetin or kaempferol glycosides and less frequently as the luteoline or apigenin glycosides. Their formation normally depends on light, so they are mainly concentrated in the outer tissues. Their concn. in free-standing leaves is considerably greater than that in any other part of the same plant, with the exception of the onion. AS

Leafy vegetables

624 Pirie (NW). A pedal-assisted unit for making leaf juice. **Experimental Agriculture** 23(3); 1987; 315-318

A miniature extraction unit for leaf juice, which does not depend on electricity is described. BV

Amaranthus

625 Singhal (RS) and Kulkarni (PR). Composition of the seeds of some **Amaranthus** species. **Journal of the Science of Food and Agriculture** 42(4); 1988; 325-331

The seeds of the 5 commonly consumed **Amaranthus** sp. have been analysed for their chemical composition and starch characteristics. A notably high fat, protein and ash content in the seeds of a sample of **A.** teunifolious as compared with other sp. has been demonstrated. All the samples analysed had a high oxalate and phytic acid content. The size of the starch granules from all the samples was in the range 0.8-2.3 MUm and the circular shape of granules from all the sp. was strikingly similar. **Amaranthus polygamous** and **A.** gracilis had low amylose starches (111.7 and 97.1 g kg^{-1}, resp.), and **A.** spinosus and **A.** teunifolious had appreciable proportions of amylose (166.7 and 245.0 g kg^{-1}, resp.). AS

Lettuce

626 Bottcher (H). Quality changes during the storage of head lettuce (Lactuca sativa L. var. capitata L.) Part 1. External quality traits. **Nahrung** 32(1); 1988; 21-25 (De).

In storage tests with head lettuce, extending over several yrs, at temp. of + 0.3 and 4 C, a linear rise of fresh wt.losses which increased regressively with the duration of storing (x in days) (Y = Beta$_{I}$ x - Beta$_{II}$ x^{2}), when applying outdoor-ventilation was recorded. External quality deteriorated linearly due to developing wilt and rot. All traits were significantly affected by the storage temp. independently of the applied level. Shelf-life is exclusively a function of the external quality and takes an exponential course in dependence on the storage temp. Theta (Y = 17.008 $e^{-0.111}$ Theta). AS

627 Bottcher (H). Quality changes during the storage of head lettuce (Lactuca sativa L. var. Capitata L.) Part 2. Nutritional value. **Nahrung** 32(1); 1988; 27-36 (De).

Averaging the results of 4 test series, it was found out that the storage of head lettuce at temp. of + 0.3.16 C causes - in dependence on the duration of storing (x in days) - a linear decrease in the dry matter content of the product and a degressive increase in dry matter losses ($Y= Beta_{I} x - Beta_{II} x^{2}$). The content of total vitamin C may decrease degressively by 75%, the calculated loss (y) can be expressed by the regression function ($Y = Beta_{I} (1 - e^{-C Theta^{x}})$) and reveals significant gradations. The decrease in total carotene becomes larger by the time of storage, reaching a max. value of 29% (at + 03 C). Total carotene losses, however, increase linearly. The titratable total acid content takes a two-peaked course with intermediate ascend up to 17% and descend, certainly due to senescence. The selected storage temp. affects the contained substances to be tested much more than annual cropping conditions or var. characters. AS

Tomatoes

628 Daood (H) and Biacs (PA). Some properties of tomato lipooxygenase. **Acta Alimentaria** 17(1); 1988; 53-65

Lipooxygenase (E. C. I. 13. II. 12) was extracted from tomato fruits (**Lycopersicon esculentum** var. ventura) by a modified procedure. The enzyme activity increased proportionally with the progress of ripening at the last stages. The crude and partially purified enzyme was found to be stable at 40 C and pH 7 for a wk without any measurable loss in activity. The enzyme resisted heat treatment at 60 C for 2 min. Kinetic properties, effects of EDTA and reaction products of the enzyme confirm that a true lipooxygenase exist in tomato extract, and no other lipid oxidising agents. The enzyme activity had an optimum at pH 4.0-4.5 and $K_m = 0.37 \times 10^{-5}$ mol with linoleic acid substrate. The enzyme activity in the supernatant of 0.6 saturation with NH_4/SO_4 was 3 times higher than that found in the crude extract. This indicates the removal of some inhibitor during the fractionation process. The fraction of 0.3-0.6 saturation was found to have an inhibitory effect on the partially purified enzyme. AS

629 Efiuvwevwere (BJO) and Thorne (SN). Development of chilling injury symptoms in stored tomato fruits (**Lycopersicon esculentum** Mill.). **Journal of the Science of Food and Agriculture** 44(3); 1988; 215-226

Mature-green tomato fruit cv Calypso were stored at 5, 7, 12 or 19 C for 0, 3, 9, 12, or 21 days, ripened at 19 C for 3 or 6 days and analysed for surface colour (a_L / b_L ratio), firmness, and tissue disorganisation in chill-damaged (pitted) and adjacent unpitted tissues. Manifestation of cell disorganisation and death was evident in pitted tissues. **Alternaria** spp. **Stemphylium** spp. **Penicillium** spp. and **Aureobasidium** spp. were isolated from pitted tissues. Fruits stored for either 9 or 12 days at 5 or 7 C subsequently ripened to an acceptable colour, but longer storage times inhibited satisfactory colour development. After storage at 12 or 19 C, fruit surface colour improved progressively with time. Loss of fruit firmness was highest at 19 C but decreased with increasing temp. from 5 to 12 C, showing biphasic maxima firmness loss on days 9 and 21. Surface pits occurred at the stem end and in the equatorial region of the fruit. Fruits were also stored at 7, 12 or 19 C for 10 or 20 days and then ripened at 19 C for 10 days before evaluation of visible defects: these were greatest at 7 C followed by 19 C and were lowest at 12 C. AS

630 Leoni (C) and Sandei (L). Nitrate determination in tomato products. **Industria Conserve** 63(1); 1988; 26-33 (It).

High nitrate levels in food packed in tinplate cans activate corrosion reactions on the inside of the container. Three methods for determining nitrates in foods (conventional colorimetric method, use of the Technicon Autoanalyzer, use of a nitrate-specific ion electrode) were tested for reliability when applied to tomato products. The conventional colorimetric method, which involves reduction of nitrates on a metallic-cadmium column followed by the formation of a diazo compound, was found to give satisfactory results when modified as follows: Substitution of granular for spongy metallic cadmium; wt. of sample for the analysis chosen on the basis of the total solids content of the product; extraction of the sample with water at about 70 C; filtration of the aqueous extract through a fritted-glass filter after addition of Carrez precipitant solutions I and II; elution from cadmium column with a buffered solution of pH 9.6-9.7; The Technicon Autoanalyzer method proved poorly accurate as a consequence, above all, of the low nitrate-ion level in tomatoes in comparison with the nitrate- and nitrite ion levels in meat products, for which the method was originally intended. The method with the Orion nitrate-selective electrode requires interferences from chlorides, carbonates and organic-acid anions to be removed or at least to be reduced as much as possible. The use of recommended interference suppressor proved inefficient. AS

631 Pirone (G) and La Pietru (L). Levels of contamination of tomatoes by spores of butyric acid clostridia. **Industria Conserve** 63(1); 1988; 37-38 (It).

Peeled whole tomatoes, diced tomatoes and tomato juice used as packing medium in the canning of these two products were examined for contamination by spores of butyric acid clostridia. In the peeled and the diced tomatoes the highest spore counts were 8.5. 10^2 g and 1.6. 10^2 /g resp. The highest spore count in the unpasteutrised tomato juice was 1. 10^2 /g; no viable spores were found in 10 ml of juice after heat treatment. AS

632 Purnima Sinha, and Saxena (SK). Change in ascorbic acid content in tomato fruit inoculated with **Aspergillus niger** and **Drosophila busckii**. **Current Science** 57(20); 1988; 1134-1135

Change in the ascorbic acid content of tomato fruit infected with **Aspergillus** niger, in the presence of an insect, **Drosophila busckii** is reported. The reduction in ascorbic acid was directly proportional to the increase in the exposure to insect and also increased incubation period after inoculation. The % reduction was highest in fruits inoculated with fungus followed by fungus inoculated together with insect fed. In insect alone with reduction was 69.5% after 30 min. duration and in fungus it was 86.3% while with fungus together with insect the reduction was less than that seen with fungus only but more than that with insect only for 30 min. duration. It appeared that the ascorbic acid oxidase which is known to metabolising ascoric acid was more active in fruits infected with fungus than in insect but with insect and fungus together the enzyme activity was slightly reduced. NGKR

633 Vicini (E), Gherardi (S), Bonici (A), Zoni (C) and Trifiro (A). Metabolite production and chemical changes in vegetable products caused by some types of microorganisms. 1. Strained tomatoes. **Industria Conserve** 63(1); 1988; 39-44 (It).

A study was undertaken on the most important changes in chemical composition taking place in strained tomatoes after inoculation with some microorganisms (**L. plantarum**, **L. brevis**, **Pediococcus** sp., **S. cerevisiae**) chosen from among those which most commonly occur and grown in vegetable products. It was found that microbial activity could already be detected after 12 h from its beginning by evaluating some chemical parameters (L-and D-lactic acids, diacetyl, acetic acid and ethanol). This allows spoilage to be timely counteracted by suitbale heat treatments and therefore irreparable losses of product to be avoided. AS

Tomato products

Tomato paste

634 Porretta (S), Sandei (L) and Leoni (C). Possibility of mathematically evaluating the colour index of a tomato paste at any soluble solids content. **Industria Conserve** 63(1); 1988; 34-36 (It).

A function has been determined which can be used to calculate the colour index (a_L b_L ratio) of a diluted tomato conc. from the colour index and the soluble solids content of the original product. The proposed equation has the following from: $Y = 0.1298 + 7.8826x - 0.1733 x^2$, where y is the per cent relative change in soluble solids content and x is the per cent relative change in a_L b_L ratio. AS

Vegetable products

Salads

635 Paredes (MDC), Rao (MA) and Bourne (MC). Rheological characterization of salad dressings. 1. Steady shear, thixotropy and effect of temperature. **Journal of Texture Studies** 19(3); 1988; 247-258

Shear stress-shear rate data of five commercial salad dressings at 2.0, 10.0, 18.3, 26.7, 32.2, and 43.3 C were obtained using a concentric cylinder viscometer. The power law and Casson equations were applicable for all products (r greater than or equal to 0.98). The Arrhenius equation was applicable for the effect of temp. on the apparent viscosity at 100 s^{-1} (r greater than or equal to 0.97). Rheological data were obtained at a constant shear rate of 275 s^{-1} at 2.0 and 10.0 C. The results show that the Weltaman equation was better than the Hahn equation in describing the thixotropic behavior of the five salad dressings. AS

FRUITS

Amla

636 Kalra (CL). The chemistry and technology of amla (**Phyllanthus emblica**). A resume. **Indian Food Packer** 42(4); 1988; 67-82

This review covers var., harvesting, storage and the diseases, physical characteristics, chemical composition, processing technology including the preparation of preserves, pickle, juice and concentrate, squash, syrup, and dehydration of amla. 110 references. KAR

637 Tripathi (VK), Singh (MB) and Surjeet Singh). Studies on comparative compositional changes in different preserved products of amla (**Emblica officinalis** Gaertn) var. Banarasi. **Indian Food Packer** 42(4); 1988; 60-66

Preserves, jam, juice, candy and dehydrated products of amla (**Emblica officinalis** Geartn) var. Banarasi were studied for chemical changes during processing and storage for 135 days. As compared to fresh fruit, most of the constituents including soluble solids content, vitamin C, total sugars, pectin, tannin, and protein contents, decreased in amla products. Increased acceptability was observed in amla preserve upto 135 days of storage and in jam for 45 days whereas amla candy, juice and the dehydrated products decreased with storage period. VKR

Apples

638 Gradel (A), Muller (G) and Nickel (U). Tests about the anaerobic storage of wet apple pomace. **Lebensmittelindustrie** 35(1); 1988; 39-42 (De).

The authors have tested the anaerobic storage of wet apple pomace. They stated the quick and intensive propagation of yeasts. Hyphomycetes occurred only at the beginning, but bacteria existed steadily in changing amounts. Microorganisms do not come into question-or only in low portion-for the destruction of the pectin within short time, so they proved. The isolated yeasts Saccharomyces cerevisiae and Brettanomyces intermedius are not able to decompose the pectin. AS

639 Kovacs (E), Keresztes (A) and Kovacs (J). The effects of gamma irradiation and calcium treatment on the ultrastructure of apples and pears. **Food Microstructure** 7(1); 1988; 1-14

The effect of low dose irradiation (1KGY) alone or combined with calcium treatment on the microstructure of apples and pears has been elucidated. Results show that low dose irradiation induced softening in the fruit, dissolution of middle, wrinkling of cell membranes which generally remained intact, and retention of starch by plastids of the skin. Calcium treatment preserved the cell membranes and middle lamellae. The combined treatment preserved the cell compartments best (with a lot of starch in the plastids, the cytoplasm remained essentially unchanged). However, this treatment could not prevent the break down of the middle lamellae in irradiated tissue. MVG

640 Rebouillat (S) and Peleg (M). Selected physical and mechanical properties of commercial apple cultivars. **Journal of Texture Studies** 19(3); 1988; 217-230

The compressive modulus of deformability, strength and strain of failure of apple flesh of 12 commercial apple cvs were determined using a Universal Testing Machine. The deformability modulus, calculated from the linear part of the corrected Stress-Hencky's strain relationship was between 1.5 and 2.3 MPa with a coeff. of variation of 9-26%. The apparent upper limit of the strain in the linear region was on the order of 0.08-0.2. The compressive strength was on the order of 160-280 KPa, with the Baldwin' apples a notable exception with strength twice as large. Failure usually occurred at a strain of 0.12-0.16 with the exception of the Baldwin' and Granny Smith' apples for which failure occurred at a strain of 0.25 and 0.2, resp. The variability in the failure parameters expressed as the coeff. of variation was usually on the order of 15 - 20%. Neither the total soluble solid content nor the fruit density could serve as a predictor of the flesh mechanical properties. The effect of the specimen dimensions and the deformation rate (in the range of 0.5-2 cm min) had only minor influence on the flesh mechanical behavior. AS

Apricots

641 Bhutani (VP) and Sharma (YP). Studies on the drying of apricots grown under dry temperature conditions. **Indian Food Packer** 42(4); 1988; 83-88

Effect of treatment of alkali (dipping fruits for 30 sec. in boiling 0.2 or 0.5% sodium bicarbonate solution) oil, sulphur (burning 2 g of sulphur/kg of fruit in wooden box for 3 h) followed by drying in sun or in cross flow drier at 55 plus or minus 2 C. On the quality, of dried product in apricot (cv. Khadra No. 1, `Shakarpara Afghanistan', `Sufaids oblong') were studied. Drying of apricots was faster in cross-flow drier than in sun-drying. Drying time was reduced in alkali treated fruits. Untreated apricot halves took min. time for drying in cross flow dehydrator and in open sun as compared to treated whole fruits. Recovery of dried fruits was max. in cv. `sufaida' oblong followed by `Khadra' No. 1 and drying ratios were lower in whole fruits than for halves. The quality of fruits dried in cross flow dehydrator was better than by sun-drying. VKR

642 Valente (M), Chambroy (Y), Flanzy (C), Brueils (L) and Souty (M). Anaerobic metabolism, freeze concentration and apricot sorbets. **Fruits** 43(2); 1988; 107-111 (Fr).

Ripe apricots (cv. Rouge du Roussillon) treated under strong hypoxia levels for 2, 4 and 8 days at 30 C of 10 days at 15 C provide different materials for elaboration of various new products. Apricots were freeze concn. under high pressure, after anaerobic metabolism (MA). Different sorbets were elaborated from these conc. Under our experimental conditions, these sorbets were not organoleptically satisfactory, or were not different from those obtained from raw apricots. In order to optimize the MA step, further investigations in relation with temp. and time parameters, will be carried out. **AS**

Avocadoes

643 Garcia-Villanova (B), Ruiz (MD) and Garcia-Villanova (R). Comparative study on drying methods and time for extracting lipids of "Reed" avocado fruits. **Revista de Agroquimica y Tecnologia de Alimentos** 28(1); 1988; 145-150 (Es).

Preliminary studies on detn. of both moisture and lipid content of the commercial avocado var. "Reed" were carried out. Comparing microwave (MW) and drying oven (DO) at 105 C, it was found that drying of specimens by MW was obtained in twelve minutes, whereas by DO 24 h were required. By using the Soxhlet method the time needed for the quantitative extraction of lipids did not exceed 2 h. **AS**

644 Wills (RBH), Yuen (MCC), Murtiningsih Utami (D). Effect of calcium infiltration on delayed ripening of Minyak avocado. **ASEAN Food Journal** 4(1); 1988; 43-44

Bananas

645 Areas (JAG), Garcia (E) and Lajolo (FM). Effect of protein synthesis inhibitors on the climateric of banana (**Musa acuminata**). **Journal of Food Biochemistry** 12(1); 1988; 51-60

The effect of infiltration of protein synthesis inhibitors (cycloheximide and actinomycin D) on carbon dioxide and ethylene production of banana slices in the absence of added ethylene has been studied and results presented in this paper. These inhibitors were infiltrated into banana slices by contact or under vacuum. Drastic reduction of the climacteric period was observed in both types of infiltration when cycloheximide was infiltrated into slices,. compared to the actinomycin D group and to a control group infiltrated with water. Ethylene production was seen to be stimulated when these inhibitors were used as compared to the control group and it was higher in the vacuum infiltrated groups. It was observed that these inhibitors affect the equilibrium of ripening differently with distinct responses. NGKR

646 Marchal (J), Nolin (J) and Letorey (J). Effect of coating with semper-fresh on ripening of bananas. **Fruits** 43(7-8); 1988; 447-453 (Fr).

Bananas coated with semper-fresh (concn. 0.0 > 1.0-1.5%) was tested. Changes in bananas were observed in Guadelocyse and Metropolitan France, after refrigerated or non-refrigerated transport. Physical analysis and chemical analysis have confirmed that the ripening of treated bananas is delayed without any deterioration in their flavour. BV

Figs

647 Thonta (GT) and Patti (VK). Studies on drying of fig fruits (**Ficus carcia L.**) **Indian Food Packer 42(4); 1988; 94-99**

Ethrel treated (5000 p.p.m. for 3 min) and sugar treated immersing in 53 C boiling sugar solution for 2 days. Daulatabad fig fruits were sun-dried. Sugar solution treated fruits were also pricked and dried in oven (58 plus or minus 5 C) or in the open. Ripe figs were also covered with dry sugar in 2 days and kept in oven or in open for drying. Ethrel treated fruits needed 30 h sun-drying and the untreated 35 h; ethrel treatment helped in losing water from fig fruits. Max. ratio of fresh to dried fruit was observed in untreated control fruits which also showed more of reducing and total sugar than the ethrel treated fruits. Soluble solids content increase was max. (44-46%) in fruits treated in sugar solution and fruits kept in dry sugar oven. Drying period was also min. for the pricked and unpricked fruits placed in sugar solution and kept in oven. The fruits in dry sugar subjected to oven treatment were organoleptically good and were comparable to fig fruits from market. KAR

Grapes

648 Ladania (MS) and Dhillon (BS). In-package sulphur dioxide treatment of table grapes during long term refrigerated storage. **Indian Food Packer 42(4); 1988; 53-59**

Thompson Seedless' and Anab-e-Shahi' grapes were packed in 3 ply CFB cartons with in-package sulphur dioxide generators and vented unvented polyliners were stored at refrigerated (1 plus or minus 1 Degree C, 85-90% RH) condition for 70-80 days. Wt. loss (%), berry shatter, decay, bleaching, berry browning berry cracking and residual sulphur dioxide were estimated. Wt. loss and berry shatter was more in `Thompson Seedless' var. Sulphur dioxide treatment completely suppressed decay in both the var. Bleaching was considerably less with vented polylined cartons equipped with in package sulphur dioxide generators. `Anabe-e-Shahi' was more prone to browning. Berry cracking was less in `Anab-e-Shahi'. `Thompson Seedless' and `Anab-e-Shahi' grapes were stored in good condition up to 80 and 70 days resp. KAR

649 Nicol (M-Z), Romieu (C) and Flanzy (C). Anaerobic metabolism of aspartate and glutamate in grape berries. **Sciences des Aliments 8(1); 1988; 51-65 (Fr).**

Aspartic and glutamic acids are strongly metabolised during the first h of grape anaerobic metabolism. We injected aspartate U- ^{14}C and glutamate U- ^{14}C in grape berries (**Vitis vinifera**) which were then kept at 35 C, in darkness, in a carbon dioxide atm. in order to study the evolution of the amino acids. Most of the radioactivity from aspartate U-^{14}C was found in ethanol, malate, Gamma-aminobutyrate, succinate and fumarate. Most of the radioactivity from glutamate U-C was found in Gamma-aminobutyrate: alanine, pyrrolidone carboxylate, ethanol, malate and succinate had a lower radioactivity. Hypothesis on metabolic pathways for these two compounds are suggested. AS

650 Verries (C), Sarris (J), Romieu (C), Pradal (M), Tesniere (C) and Flanzy (C). Influence of temperature and carbon dioxide concentration on the anaerobic metabolism of grapes. **Sciences des Aliments** 8(1); 1988; 67-81 (Fr)

Berries are set in closed glass jars filled with different gaseous phases containing 100-90%, 50% and 10% carbon dioxide. The gaseous phases are sampled daily for carbon dioxide and ethanol analysis. The juice of the crushed berries is analysed at the begining and at the end of the experiment. The anaerobic metabolism is evaluated by the ethanol production in the atmosphere. At a temp. of 32 C, which is optimal for industrial carbonic maceration, a concn. of 60% of carbon dioxide seems necessary to obtain the max. intensity of anaerobic metabolism. At a temp. of 10 C, at which the degradation of malic acid does not occur, the anaerobic metabolism depends more on the temp. than on the carbon dioxide concn. Our results confirm the preponderant importance of the temp. factor in the catabolism of malic acid during anaerobic metabolism. AS

Loquat

651 Verma (RA) and Tripathi (MP). Studies on varietal screening of loquat (**Eribotrya japonica Lindle**) for canning. **Indian Food Packer** 42(4); 1988; 89-93

The chemical and physical observation of 10 cv of loquat were recorded. The parameters determined included net and drained wt. of cans, soluble solids, reducing and total sugars, acidity, ascorbic acid, total carotenoid, tin content and organoleptic quality. Canned fruits had soluble solids content of 28-30 C Brix. Canning reduced the acidity, ascorbic acid content and carotenoids but increased the reducing sugars. Heavy detinning was observed in all the var. on account of bigger fruit size, firm texture, attractive colour, pleasant taste and flavour, var. `Tanaka', `Golden Red' and `Improved Golden Yellow' were found to be superior over other var. for canning. KAR

Mangoes

652 Chauhan (HL), Vala (DG) and Joshi (HU). Remedies for the post-harvest diseases of mango fruits. **Pesticides** 22(10); 1988; 15-17

Warm and cold solutions of 9 fungicides together with two cultural treatments were tried at ambient temp. to increase shelf life of Alphonso fruits. The intensity of post-harvest rots was recorded on 11th, 17th and 22nd day. The persistence of fungicidal residue upon or in the treated fruits was measured in terms of growth inhibition zone of test fungus. Dipping fruits in warm 52 C plus or minus 1 solution suspension of carbendazim 300 p.p.m., captafol 1500 p.p.m. and Benomyl 300 p.p.m. for 10 min. can check the post-harvest rots. Fruits can be preserved for more than 3 wks without infection. After warm treatment of fungicides, if the fruits are seen dried, the shelf-life can be further enhanced. Alphonso fruits would ripen about a wk after harvest and remain edible for further period of a wk at most. By suggested treatments it can be easily kept under edible conditions for a period of more than three wks. Observation also indicated that normally more than 50% fruits would be rotted and lost before ripening, if allowed to be ripened without treatment while in treated fruits such rotting was negligeble. When treated with cold or warm suspension of fungicides, no residues persist in fruit pulp, even after 8 days but only cold treatments showed true for pericarp. Warm fungicidal solution is more effective. NGKK

Peaches

653 Costell (E), Baidon (S) and Duran (L). Rheological behaviour of diluted peach jams. Influence of both soluble solids and fruit content. **Revista de Agroquimica y Tecnologia de Alimentos** 28(1); 1988; 115-126 (Es).

Changes in rheological behaviour produced by the dilution with water were studied in peach jams of different fruit contents (30.3, 39.0, 45.8, 51.9 and 61.5%). Soluble solids concn. (SS), obtained by dilution, initial fruit content of jams (F), and the interaction between both factors showed significant effects (P less than or equal to 0.01) on the rheological parameters Tau_0 , K, n and Eta_{100} In jams diluted to 60 Brix, changes in (F) produced changes in the values of Tau_0 , K and Eta_{100} but not in those of the flow index n. When jams were diluted to 40 Brix the opposite effects were found. This finding opens new possibilities to the search of rheological indices of the fruit content in jams. The relationships of rheological parameters of jams of different (F) with (SS) were fitted to both potential and exponential models and the results interpreted on structural bases and in comparison with the behaviour of other fruit products. AS

CONFECTIONERY, STARCH AND SUGAR

Confectionery

654 Bujak (T). About the analysis of the technical-economic level of machines. **Lebensmittelindustrie** 35(1); 1988; 17-19 (De).

Based on the grounds of the uncertainites of calcultatior of values, the author introduces a method of the selection of production equipment on basis of the technical and economical parameters of the machines and considering their value in use. In this connection parameters are explained which can be main parameters for every assessment or specific parameters for individual products. The author demonstrates this method by example of the candy and chocolate industry in Poland. AS

655 Miller (JF). Confectionery in perspective. It's not just kid's stuff. Food Technology in Australia 40(10); 1988; 404-407

This article reviews the confectionery industry and its various aspects such as the market and the industry, major ingredients, a brief look in packaging, from arts and crafts to technology and science, confectionery and health, toward 2000 etc. NGKR

Chewing gum

656 Fritz (D). Chewing gum formulation. Manufacturing Confectioner 68(9); 1988; 128-135

Formulations for different types of chewing and bubble gums are described. Formulations can vary depending on the cost, selling price, piece size and shape, wrapping machine used, climate and custom of the selling country. Standard formulae can be modified to achieve development of desired flavour, chew and bubble character. SYR

Chocolates

657 Riedel (HR). Chocolate bars with crisp fillings. Confectionery Production 54(9); 1988; 585-586

The process of preparing krokant, which is based on a mixture of caramalised sugar with almonds, hazelnuts or walnuts is briefly described. Also the coating of this krokant with chocolate and sugar glaze were described. SYR

Starch

658 Toldra (F). Perspectives for industrial use of immobilized glucoamylase in the starch hydrolysis. Revista de Agroquimica y Tecnologia de Alimentos 28(1); 1988; 31-44 (Es).

Characteristics and physicochemical properties of glucoamylase (Alpha-1, 4 glucan glyucohydrolase, EC, 3.2.1.3.) are described. Glucoamylase use in the industrial production of glucose syrups from starch is also detailed. Possibilities for industrial use of glucoamylase immobilized in different ways to inert supports are evaluated as well as problems still remaining before its application, especially due to reversion products formation. Finally, research trends in this field are summarized. AS

659 Wyatt (GM) and Horn (N). Fermentation of resistant food starches by human and rat intestinal bacteria. Journal of the Science of Food and Agriculture 44(3); 1988; 281-288

Resistant starches prepared from maize and peas were fermented in vitro with rat or human intestinal bacteria. With both inoculum types, degradation of pea starch after 24 h incubation (0 and 47% utilised by rat and human organisms, resp.) was markedly slower than that of maize starch (73 and 85%) and was incomplete even after 7 days, incubation; degradation of both starches was slower than with soluble starch or sucrose. The slow degradation of pea starch was not due to the presence of intact cell walls. Qualitatively, the production of C2-C4 volatile fatty acids was similar for all substrates and both inoculum types but there were some quantitative differences. If resistant food starches are to be regarded as dietary fibre, then, like true fibre, any physiological effect in vivo may depend on the type of starch involved. AS

BAKERY PRODUCTS

Bread

660 Barber (S) and Baguena (R). Microflora of the sour dough of wheat flour bread. V. Isolation, identification and evaluation of functional properties of sour dough's microorganisms. **Revista de Agroquimica y Tecnologia de Alimentos** 28(1); 1988; 67-78 (Es).

661 Barber (S), Torner (MJ), Martinez-Anaya (MA) and Benedeito de Barber (C). Microflora of the sour dough of wheat flour bread. VI. Effects of freeze-drying on the viability and functional properties of lactobacilli from bread dough fermentation. **Revista de Agroquimica y Tecnologia de Alimentos** 28(1); 1988; 79-89 (ES).

662 Bartnik (M) and Florysiak (J). Phytate hydrolysis during breadmaking in several sorts of Polish bread. **Nahrung** 32(1); 1988; 37-42

The quantitative changes of phytates taking place during preparation of some sorts of Polish bread were investigated. Sorts of bread chosen for investigation were produced from raw materials with a high phytate content: flour of high extraction, soybean flour, bran and wheat germ. The content of phytic phosphorus was determined in all components (raw materials), intermediate products and bread. The degree of phytate hydrolysis during preparation of different sorts of bread varied and depended both on the initial amount of these compounds in raw materials used and on the technological process adopted. The most intensive hydrolysis of phytate took place during preparation of rye bread, about 80% of the initial value were hydrolyzed. Almost in all sorts of wheat bread the degree of hydrolysis of phytate was much less: only about 25-60% of these compounds were decomposed. In case of "mixed" bread (wheat and rye one) undecomposed phytate varied from 6% to 49% of the initial value. AS

663 Chhabra (P) and Sidhu (JS). Fate of phytic acid during breadmaking. **Nahrung** 32(1); 1988; 15-19

Cakes

664 Kamel (BS) and Rasper (VF). Effects of emulsifiers, sorbitol polydextrose, and crystalline cellulose on the texture of reduced-calorie cakes. **Journal of Texture Studies** 19(3); 1988; 307-320

Chapathies

665 Leelavathi (K) and Haridas Rao (P). Chapathi from germinated wheat. **Journal of Food Science and Technology, India** 25(3); 1988; 162-164

Germination of wheat increased the contents of reducing sugars, diastatic activity and damaged starch while the gluten content, falling number and chapathi water absorption decreased. Chapathi made from germinated wheat had better taste (sweetish) but slightly hard texture as compared to chapathi prepared from ungerminated wheat (control). Germinated wheat chapathi stored for 4 days possessed better texture and overall quality than the stored control wheat chapathi. PHR

MILK AND DAIRY PRODUCTS

666 Das (H) and Gupta (PK). An approximate method of finding `affectiveness' NTU relationship of a plate heat exchanger having complex flow pattern. **Indian Dairyman** 40(1); 1988; 29-37

A method for the detn. of number of transfer unit (NTU) of a plate heat exchanger (PHE) having complex flow arrangement is described and it is also shown that the value of overall heat transfer coeff., NTU can be estimated from the experimental data. A comparison between the experimental NTU value and the one obtained of empirical equations is also discussed. MVG

667 Mathur (BN) and Nagarcenkar (R). Role of standardization in the growth of dairy industry in India. **ISI Bulletin** 2(5); 1988; 199-201

Aspects dealt with include standardisation of milk inputs, processed milk, milk products and microbial safety aspects. Standardization work done at international level has also been briefly reviewed. MVG

668 Muller (LL). Advances in dairy processing. **Food Technology in Australia** 40(10); 1988; 414-416

This review covers advances in dairy processing in Australia, trends since 1970 in milk production and its manufacturing, advances in processing liquid and cultured products, butter and cheese, applications of ultrafiltration, dried products and conclusions. NGKR

669 Prajapati (JB) and Batish (VK). Potential of recombinant DNA technology in dairy industry. **Indian Dairyman** 40(1); 1988; 43-48

The application of recombinant DNA technology in certain target areas of dairy industry like improved starter cultures, dairy enzymes production of microbial calf rennet, accelerated cheese ripening, efficient whey utilisation and biological stabilisation of dairy waste, has been reviewed. MVG

Milk

670 **Garg (SK) and Sardana (VK). Natural antimicrobial substances in milk system. Indian Dairyman 40(1); 1988; 25-28**

The biological significance of the presence of certain antimicrobial systems in milk like immunoglobulins, phagocytes and whey proteins including lactoferin, lysozyme and lactoperoxidase system have been reviewed. KAR

671 Kapoor (SK) and Kalra (RL). Residues of HCH in milk after its oral administration or dermal application to Indian buffalo, **Bubalus bubalis** (L). **Pesticide Science 24(3); 1988; 193-204**

The excretion of HCH (hexachlorocyclohexane) residues in the milk of Indian buffalo, the main milch cattle of India, after oral or dermal exposure to technical HCH was studied. Following the intake of 10, 25, 50 and 100 mg of technical HCH by different groups of buffaloes, HCH residues in milk showed an initial rapid rise but soon attained a dose-dependent equilibrium. The transfer coeff. of HCH residues in milk fat at "plateau" showed an average value of about 15%. Half-life values for the rate of decline of HCH residues during the post-dosing period were computed according to a two open-compartment model. Dermal application of technical HCH to buffaloes also resulted in significant residues in milk. The proportions of alpha-, beta, gamma- and delta- isomers of HCH in milk of buffaloes following oral and dermal routes of exposures were different. The significance of these results in the regulation of HCH residues in milk is discussed. AS

672 Knutson (KM), Marth (EH) and Wagner (MK). Use of microwave ovens to pasteurize milk. **Journal of Food Protection 51(9); 1988; 715-719**

High-temp. short-time (HTST) and low-temp. long-time (LTLT) pasteurization were simulated using uninoculated and inoculated milks that were heated in microwave ovens. Heating milk (76 ml) for 59 s at 700 W achieved a temp. of 71.7 C, but heating for 60-65 s and holding for 15 s failed to inactivate all added cells of **Salmonella typhimurium, Escherichia coli** or **Pseudomonas fluorescens**. Milk, 453.6 g (ca. one-half quart) or 604.8 g (ca two-thirds quart), was heated to > 62.8 C, but < 71.7 C, in 4.5 to 5 min, depending on power (550 or 700 W) that was used, and refrigerated overnight. Such treatments failed to reduce the population of **Streptococcus faecalis** in the milks by the degree that occurred when inoculated milk was heated in a water bath at 62.8 C for 30 min. AS

673 More (GR) and Prasad (S). Thermal conductivity of concentrated whole milk. **Journal of Food Process Engineering 10(2); 1988; 105-112**

The information of thermal conductivity of milk is required for the design of heat exchanger equipment in the dairy processing. Thermal conductivity of whole milk was experimentally determined by a steady-state, parallel disk, relative method at various concn. (from 37 to 72.4% total solids) and temp. range between 40 to 90 C. This thermal property of milk increased with rise in temp. and decreased with increase in total solids content and its values varied from 0.278 to 0.491 W/m K. An expression has been proposed for derivation of milk thermal conductivity from temp. and total solids content. AS

674 Prasad (C). Effect of concentration and homogenization on heat stability of concentrated milk and manipulation of stability by additives. **Indian Dairyman** 40(1); 1988; 39-42

The need for addition of some additives like citrates or polyphosphates to conc. milk before sterilisation to optimise heat stability to avoid coagulation of buffalo milk conc. during sterilisation, has been discussed. MVG

675 Prasad (G), Murari (K) and Singh (U). Effect of preheating on milk stability and on its constitutents in the manufacture of milk concentrates. **Indian Dairyman** 40(2); 1988; 60-71

676 Ramaswamy (NS). Adjunct to the milk systems. **Indian Dairyman** 40(1)7-20;

677 Singh (RRB) and Patil (GR). UHT processing of milk under Indian conditions. **Indian Dairyman** 40(2); 1988; 85-91

It has been shown that buffalo milk is quite vulnerable to UHT system in that, during storage, the physico-chemical and biochemical changes, UHT buffalo milk appear far more rapidly than in cow milk. Therefore this review covers aspects like various aspects of UHT processing of buffalo milk including changes taking place in Maillard type reactive oxidative changes, lipolytic changes, pH changes, quality of raw milk and time-temp. combination, sedimentation and deposit formation problems related to heat resistant proteinases, deaeration of UHT processed milk, packaging and storage of UHT processed milk. MVG

Milk products

678 Wong (HC), Chen (YL) and Chen (CLF). Growth, germination and toxigenic activity of Bacillus cereus in milk products. **Journal of Food Protection** 51(9); 1988; 707-710

Growth, germination and toxigenic activity of **Bacillus cereus** in pasteurized milk, fruit-flavoured reconstituted milk and fermented milk at 30 C were studied. Vegetative cells of **B. cereus** rapidly increased to 10^8 CFU/ml in 8h and 10^6 CFU/ml in 12 h in pasteurized milk and fruit-flavoured reconstituted milk resp. In fermented milk, vegetative cells of **B. cereus** were killed or inactivated in 40 min; while about 31% of spores survived the 7 d test period. Spore germination of **B. cereus** was inhibited by fruit-flavoured reconstituted milk and fermented milk. Chinese hamster ovary cells were transformed and/or lysed by pasteurized milk and sterilized milk with **B. cereus** cultured for 8 h and also by lab.-prepared fermented milk with **B. cereus** introduced at the begining of fermentation and incubated for 12 or 72 h. AS

Cheese

679 Eymery (O) and Pangborn (R-M). Influence of fat, citric acid and sodium chloride on texture and taste of a cheese analog. **Sciences des Aliments** 8(1); 1988; 15-32

680 Martin-Hernandez (MC), Juarez (M) and Ramos (M). Effect of freezing on the characteristics of a semihard cheese manufactured with a mixture of goats and cow's milk. **Revista de Agroquimica y Tecnologia de Alimentos** 28(1); 1988; 45-55 (Es).

The physicochemical and organoleptic characteristics of a semihard cheese manufactured with a mixture of goat's and cow's milk, during two months of ripening, as well as the effect of freezing and frozen storage were studied. The proteolysis level estimated by the water soluble nitrogen and the casein degradation was lightly affected as a results of freezing. However the lipolysis rate and the organoleptic characteristics were similar in both control and frozen cheeses. **AS**

681 Singh (S) and Kanawjia (SK). Recent development in cheese technology. **Indian Dairyman** 40(2); 1988; 61-67

Recent development covered in this review article comprise of aspects like the present day need for promoting cheese technology, energy and labour saving aspects, shelf life, nutritional value; and amenability to modern technology covering membrane processing, ultrafilteration, reverse osmosis and biotechnology. KAR

Cheddar cheese

682 Banks (JM), Griffiths (MW), Phillips (JD) and Muir (DD). A comparison of the effects of storage of raw milk at 2 C and 6 C on the yield and quality of Cheddar cheese. **Food Microbiology** 5(1); 1988; 9-16

The advantages of storing raw milk which is to be used for Cheddar cheese manufacture, at 2 C rather than at 6 C was examined. Storage of milk at the lower temp. effectively reduced the level of psychrotroph growth, and after 4 days the psychrotroph counts in samples stored at 2 C were 100-fold lower than those found in samples stored at 6 C. There was no advantage in terms of cheese yield in storing milks at the lower temp., but an overall improvement in cheese quality was noted in samples produced from milk stored at 2 C. **AS**

Dahi

683 Garg, (S K). Dahi-a fermented indigenous milk product. **Indian Dairyman** 40(2); 1988; 57-60

The method of preparing dahi (fermented milk product) and the chemical changes taking place when prepared under Indian conditions is described. MVG

Ghee

684 Pagote (CN) and Vivek Bhandari. Antioxidant properties and nutritive value of ghee residue. Indian Dairyman 40(2); 1988; 73-77

Ghee residue is the by-product obtained while ghee making as a moist brownish residue after molten ghee is strained. The antioxidant property of ghee residue is influenced by the lipid and non-lipid constituents, temp. of clarification and method of clarification. The nutritive value of ghee residue is also described including the animal experiment results. NGKR

Khoa

685 Sawhney (IK) and Cheryan (M). Mositure sorption characteristics of a heat desiccated whole milk products (Khoa). Lebensmittel-Wissenschaft und-Technologie 21(4); 1988; 239-241

Moisture sorption isotherms of khoa with 0, 15 and 30% added sucrose were determined at 25 C and over a water activity range of 0.11 to 0.97. The isotherms were sigmoid shaped (Type II) and were fitted to the Brunauer-Emmett-Teller (B.E.T.) and Guggenheim-Anderson-de Boer (G.A.B.)equations. Monolayer moisture contents increased with sucrose concn. The initial water activities of khoa were 0.952, 0.91 and 0.846 with 0, 15 and 30% added sucrose. AS

Milk powders

Skim milk powder

686 Barraquio (VL), Fichtali (J), Ng-Kwai-Hang (KF) and Van de Voort (FR). Acid coagulation of skim milk powder by extrusion processing. Canadian Institute of Food Science and Technology Journal 21(3); 1988; 305-311

Using the extruder as a continuous reactor, skim milk powder was mixed with acid to produce an acid-coagulated product. Results show that extrusion processing appeared to be a potential means of preparing an acid coagulated product from skim milk powder as a preliminary step to the production of sodium caseinate. MVG

Paneer

687 Sachideva (S) and Singh (S). Optimisation of processing parameters in the manufacture of Paneer. Journal of Food Science and Technology, India 25(3); 1988; 142-145

As per Prevention of Food Adulteration (PFA) Act, standards for Paneer, a min. of 5.8% fat is required in buffalo milk having 9.5% solids-not-fat (SNF). A fat; SNF ratio of 1:1.65 in milk is necessary for panner making. High heat treatment of milk improved the solids recovery, yield, flavour and body and texture characteristics of paneer. A heat treatment up to 90 C without any holding is recommended. Coagulation of milk at 60 C resulted in paneer having a very weak and loose body unsuitable for frying. Coagulation at 70 C produced the desirable body and texture characteristics. Higher temp. of coagulation induced greater solids recovery but lower yield due to increased moisture expulsion. For coagulation of milk at 70 C, the optimum pH was 5.30 to 5.35. The concn. of citric acid solution that resulted in the best product was 1%. AS

Yoghurts

688 Poste (LM) and Patterson (CF). Multidimensional scaling-Sensory analysis of yoghurt. Canadian Institute of Food Science and Technology Journal 21(3); 1988; 271-278

Milk proteins

689 Dzuiba (J), Bochenek (A), Oximek (L) and Fornal (J). Microstructure of milk proteins coagulated by rennin in the presence of ethanol precipitated whey proteins. Canadian Institute of Food Science and Technology Journal 21(3); 1988; 300-304

The microstructure of gel formed by the action of rennin of skim milk enriched by the addition of 0.4% native or ethanol denatured whey proteins was studied. Whey proteins, isolated by ethanol, were in the form of oval or cylindrical aggregates having a smooth surface with a small number of bridge filaments between them. When the ethanol isolated whey proteins were added to cheese milk which was subsequently treated with rennin, the whey proteins were present in the formed gel as scarcely distributed filaments joining the casein micelle clusters and appeared to coat the surface of the micelles. AS

MEAT AND POULTRY

Meat

690 Comer (FW) and Allan-Wojtas (P). Functional and microstructural effects of fillers in comminuted meat products. Food Microstructure 7(1); 1988; 25-26

The microstructural and functional data for "all-meat" systems has been reviewed and the role fillers play in comminuted meat product stability, texture, and microstructure has been critically examined. MVG

691 Comerchero (V). Effect of rate of chilling and/or freezing on the survival of Salmonella in poultry and on meat quality. Indian Food Industry 7(4); 1988; 12-21

The literature on chilling poultry meat was reviewed to determine the effect of rate of chilling and/or freezing on microbial growth. Especially Salmonella, and on meat quality as it might bear on rate and method of chilling and/or freezing. Apparently, contradictory findings as to the bactericidal effects of rate of chilling and/or freezing in poultry are often due to (1) different bacterial counting methodologies, (2) to the lack of an agreed upon definition for "fast" and "slow" (3) to researchers use of terms and count without reference to specific resuscitation media to specific counting locations and methodologies and to specific coeff. of heat transfer or even of specific temp. drop rates. Once these ambiguities have been clarified a review of the literature indicates that freezing in a non-water based liquid immersion chiller like instra cool with its large Delta T and high coeff. of heat transfer not only enhances meat quality, it can prove a significant improvement over present methods in reducing microbial growth. AS

692 Morissey (PA) and Apte (S). Influence of species, haem and non-haem iron fractions and nitrite on hexanal production in cooked muscle systems. **Sciences des Aliments** 8(1); 1988; 3-14

Volatile carbonyl compounds formed on auto-oxidation of unsaturated fatty acids were isolated from freshly cooked beef, pork and fish, and after storage of the cooked samples of 4 C for 48 h. The carbonyl compounds were converted to 2, 4-dinitrophenylhydrazones and separated using reversed-phase high performace liquid chromatography. Hexanal formation was the most important and consistent parameter undergoing changes during oxidation and its content increased during storage and in the order: fish > pork > beef. The highest levels of hexanal were found in Fe^{2+} -catalyzed systems. Haemoglobin and ferritin were less effective catalysis than Fe^{2+} . Nitrite caused a significant reduction in hexanal production in all systems. AS

693 Walker (DJ). Trends in the Australian meat industry. **Food Technology in Australia** 40(10); 1988; 418-421

This review discusses trends in the Australian Meat Industry. Meat production remains one of Australian major industries with some half of all meat produced being exported. Future trends and expectations, meat animal processing technology, meat quality, hygiene, hot boning, future developments on the slaughter floor and packaging are also covered. NGKR

Beef

694 Babiker (RB), Patterson (JT) and Damoglou (AP). Comparison of the effect of putrefactive **Pseudomonas** sp. inoculated into muscle tissue and beef fat. **Journal of Food Science and Technology, India** 25(3); 1988; 125-128

The effect of putrefactive, **Pseudomonas** II sp. inoculated into muscle tissue and beef fat was studied. This sp. was observed to follow a different mode of attack on glucose, lactic acid and free amino acids in both meat and fat. Marked difference was noted in the pattern of utilization of amino acids in meat and fat. Rise in the pH of inoculated meat and fall in the pH of inoculated fat was noticed. The ability of **Pseudomonas** II sp., to spoil the fat earlier than the lean meat showed the importance of fat in the spoilage of meat stored aerobically at refrigeration temp. AS

695 Bansal (AK) and Mandokhot (UV). Studies on differentiation of beef from meat of other species of animals. I. Comparative specificity and sensitivity of serum raised in buffalo calves against cattle antigens. **Journal of Food Science and Technology, India** 25(3); 1988; 146-151

Antisera to differentiate cattle meat from that of the other sp. of animals were raised by injecting cattle antigen into buffalo calves and rabbits. The anti cattle buffalo (BAC) serum when tested by double immuno-diffusion (DID), immunoelectrophoresis (IE) and counter immunoelectrophoresis (CIE), reacted only with homologous cattle antigens by forming two to three precipitation lines. The anti cattle rabbit (RAC) serum could be made monospecific by absorbing with cross reacting antigens. Both the sera were found to be equally specific as they reacted only with 146 cattle but not with any of the heterologous 114 field antigens derived from buffalo, sheep, goat, pig, chicken and donkey in DID and CIE test. The minimum possible cattle protein (antigen) that the BAC serum could detect from the adulterated meats was 396 µg/ml while the RAC serum detected 198 µg/ml in some instances. The use of BAC serum to identify cattle meat is recommended. AS

696 Bernal (WVW), Bernal (VM), Gullett (EA) and Stanley (DW). Sensory and objective evaluation of a restructured beef product. **Journal of Texture Studies** 19(3); 1988; 231-246

697 Turesky (RJ), Bur (H), Huynh-Ba (T), Aeschbacher (HU) and Milon (H). Analysis of mutagenic heterocyclic amines in cooked beef products by high-performance liquid chromatography in combination with mass spectrometry. **Food and Chemical Toxicology** 26(6); 1988; 501-509

Mutton

Sheep

698 Sahoo (J) and Panda (Pc). Studies on per cent yield, meat content, bone content and proximate composition of prepackaged primal cuts of sheep. **Indian Food Packer** 42(4); 1988; 14-20

A study was conducted to estimate the per cent yield, meat, bone ratio and proximate composition of different primal cuts using adult Nalix Corriedale crossbred sheep. The per cent yield of shoulder, foreshank, brisket, rack, breast, loin and legs in relation to cold carcass wt. in males was 22.57 plus or minus 1.06, 12.56 plus or minus 0.63, 3.30 plus or minus 0.16, 9.70 plus or minus 0.40, 6.48 plus or minus 0.17, 9.52 plus or minus 0.38, 34.81 plus or minus 0.55 and in females was 19.79 plus or minus 1.13, 14.55 plus or minus 0.57, 3.40 plus or minus 0.80 10.56 plus or minus 0.39, 7.44 plus or minus 0.44, 9.02 plus or minus 0.57, 34.42 plus or minus 0.65, resp. Highest yield was recorded for leg cut in both the sexes followed by shoulder, freshank, rack, loin, breast and brisket. The study revealed that the meat:bone ratio of shoulder, froeshank, brisket, rack, breast, loin and legs in males was 1.88 plus or minus 0.12, 1.78 plus or minus 0.12, 0.86 plus or minus 0.08, 1.38 plus or minus 0.11, 2.38 plus or minus 0.23, 2.35 plus or minus 0.26, 2.32 plus or minus 0.13, and in females was 1.45 plus or minus 0.12, 1.67 plus or minus 0.18, 0.83

plus or minus 0.10, 1.10 plus or minus 0.08, 1.85 plus or minus 0.18, 1.85 plus or minus 0.30, 1.99 plus or minus 0.23, resp. It was also observed that males were superior in lean meat production for most of the cuts. The results pertaining to meat and bone contents including moisture, fat and ash % of certain cuts showed significant (P greater than or equal to 0.05) difference between sexes, parts and their interactions. No significant differences could be noticed in protein content and % yield between sexes. AS

Pork

699 Fortin (A) and Raymond (DP). The use of the electrical characteristics of muscle for the objectivedetection of PSE and DFD in pork carcasses under commercial conditions. **Canadian Institute of Food Science and Technology Journal** 21(3); 1988; 260-265

700 Greer (GG) and Dilts (BD). Bacteriology and retail case life of spray-chilled pork. **Canadian Institute of Food Science and Technology Journal** 21(3); 1988; 295-299

Rabbits

701 Nakamura (M), Muguruma (M), Fukazawa (T) and Yamaguchi (M). The retention of contractility of rabbit myofibrils during storage at 25 C. **Food Microstructure** 7(1); 1988; 47-52

During postmortem storage of muscle at 25 C, myofibrils retained the ability of contract for more than 400 h under exp. conditions used to prevent bacterial contamination of the meat surface. During this time, rapid breakdown of troponin T was observed. Storage beyond 500 h resulted in rapid loss of contractility correlating with proteolysis of the heavy chain of myosin, and in this stage some granules were observed along the whole A-band within the sarcomere. AS

Meat Products

Ham

702 Flores (J), Nieto (P), Bermell (S) and Alberola (J). Changes in fatty acids during ham dry-curing process. II. Adipose subcutaneous tissue. **Revista de Agroquimica y Tecnologia de Alimentos** 28(1); 1988; 90-96 (Es).

Ham

703 Parolari (G), Rivaldi (P), Leonelli (C), Bellatti (M) and Bovis (N). Colour and firmness of raw ham in relation to raw material and processing techniques. **Industria Conserve** 63(1); 1988; 45-49 (It).

Poultry

Chickens

704 Kondajah (N) and Panda (B). Economical production of chicken sausages from spent hens. Indian Food Packer 42(4); 1988; 7-13

Experiments were conducted starting from spent hens to chicken sausage formulations for better utilisation and to get higher returns from spent hens. The detailed studies covered all aspects of components yields deboning methodology, quality evaluation of the components, suitable formulation development and keeping quality of the chicken sausages. In the present paper cost of production of chicken sausage formulations utilising different edible by-products are compared. A reduction of about 25-30% in production cost has been shown possible when whole meat (deboned meat + skin + gizzard + heart + cooked meat) or total meat (deboned meat + skin + gizzard + heart) components are utilised compared to only deboned meat (meat from breast + leg + wing + back) formulations. Production of whole meat or total meat sausages facilitates utilisation of low value components into a better product and eliminates the disposal problem of less preferred components such as skin, gizzard, heart and yolk and brings max. returns from spent hens besides contributing substantially to the economical production of chicken sausages. AS

Broilers

705 Gallo (L), Schmitt (RE) and Schmidt-Lorenz (W). Microbial spoilage of refrigerated fresh broilers. I. Bacterial flora and growth during storage. Lebensmittel-Wissenschaft und-Technologie 21(4); 1988; 216-223

706 Regez (P), Gallo (L), Schmitt (RE) and Schmidt-Lorenz (W). Microbial spoilage of refrigerated fresh broilers. III. Effect of storage temperature on the microbial association of poultry carcasses. Lebensmittel-Wissenschaft und-Technologie 21(4); 1988; 229-233

For the detn. of the influence of storage temp. on the spoilage flora of chicken, poultry carcasses packed in polyethylene bags were stored at 0, 4, 10, 15 and 20 C and composition as well as development of bacterial flora were studied. The spoilage flora consisted of 60 to 80 % of pseudomonads at storage temp. of 0 and 4 C, while its proportion was reduced to 40% at 10 C and at 20 C they were no more detectable. At 0 C Brochothrix thermosphacta grew more rapidly than Enterobacteriaceae. At 4 C growth was similar for both groups, whereas at 10, 15 and 20 C there was a faster increase of the Enterobacteriaceae. At 10 and 20 C Enterobacteriaceae, Acinetobacter and Aeromonas predominated. Off-odours were noticeable at total colony counts of about 10 cfu/cm 2/ independent of storage temp. AS

707 Schmitt (RE), Gallo (L) and Schmidt-Lorenz (W). Microbial spoilage of refrigerated fresh broilers. IV. Effect of slaughtering procedures on the microbial association of poultry carcasses. Lebensmittel-

Wissenschaft und-Technologie 21(4); 1988; 234-238

The effect of slaughtering procedures on the microbial association of poultry carcasses was studied in a modern processing plant. A comparative investigation was made on air and immersion-chilled broilers from slaughtering to final storage at 4 C. Scalding, evisceration and spray washing had the greatest influence on the microbial load. The spin chiller reduced the initial total aerobic count of approx. 10^4 cm^2 by about 70%. In contrast, air-chilled carcasses showed instead an increase to about 2 x 10^5 cfu/cm^2 in a refrigeration room overnight. Gram positive bacteria, especially micrococci and coryneforms constituted 75% of the flora of fresh slaughtered chicken. Slaughtering techniques had no influence on the shelf life of cold stored carcasses, since pseudomonads dominated the bacterial flora already after 4 days of storage. AS

708 Studer (P), Schmitt (RE), Gallo (L) and Schmidt-Lorenz (W). Microbial spoilage of refriegerated fresh broilers. II. Effect of packaging on microbial association of poultry carcasses. **Lebensmittel-Wissenschaft und-Technologie** 21(4); 1988; 224-228

To study the influence of packaging on the development of the spoilage flora, poultry carcasses were stored at + 4 C; 1). in a gas-tight polyethylene bag; 2). without any packing; 3). in a polyethylene bag which was opened and closed several times, for sampling. There were no significant differences in the growth of the bacteria between the unpackaged poultry and those where the package was opened several times. In the gas-tight package the bacteria grew more slowly, because the carbon dioxide content increased rapidly to 8 vol. The pseudomonads grew equally fast in all three series of storage during the first 8 days. Afterwards their growth diminished while facultative anaerobic groups like **Aeromonas**, lactobacilli, Enterobacteriaceae and **Brochothrix thermosphacta** gained dominance. The shelf life of the tightly packaged poultry was prolonged by about 30%. AS

Hens

709 Noleau (I) and Toulemonde (B). Volatile components of roasted Guinea hen. **Lebensmittel-Wissenschaft und-Technologie** 21(4); 1988; 195-197

Results of the chromatographic study of roasted Guinea hen showed 146 volatile components, 16 of them only have not been found in chicken. BV

Turkeys

710 Eckner (KF), Zottola (EA) and Gravani (RB). The microbiology of slow-roasted, stuffed turkeys. **Dairy and Food Sanitation** 8(7); 1988; 344-347

Microbiological safety of slow-roasted stuffed turkeys has been determined by inoculated experiments using **Staphylococcus aureus**, 196E, **Salmonella typhimurium**, Ht, and **Clostridium perfringens**. The results showed while **Salmonella** and Stophylococci were inactivated at max. internal temp. of 165 C achieved during slow roasting, there are possibilities of survival of spores of **Clostridium perfringens**. CTD

SEAFOODS

711 Gopalakrishna Iyer (TS). Work on technological research upgradation of quality in seafood industry carried out at Central Institute of Fisheries Technology, Cochin. **Indian Food Packer** 42(4); 1988; 21-35

This article covers the major contributions of the author as well as other scientists at the Central Institute of Fisheries Technology, Cochin, India, in the area of bacterial contamination and control in shrimp processing and other factory sanitation in fish processing. KAR

712 Iso (N), Mizuno (H), Saito (T), Enomoto (M), Ohgoshi (M) and Ohzeki (F). Effect of ratio of mannuroic acid to gluronic acid on solution properties of sodium alginate. **Bulletin of the Japanese Society of Scientific Fisheries ('Nihon Suisan Gakkai-shi')** 54(6); 1988; 1023-1026

The effect of the ratio of mannuroic acid to gluronic acid on the solution properties of sodium alginate were examined by using two samples of which the M/G ratios were 2.7 and 0.5. The reduced viscosity could not be treated according to the Huggins' equation over a critical concn. The critical concn. also corresponded to the critical point of the concn. dependence of the activation energy of flow, and were ca. 1.0 g/dl for the M-rich samples and ca. 0.5 g/dl for the G-rich sample. The results showed that the G-rich samples has a large chain entanglement in solution. AS

713 Nestel (P). Fish or fish oil? **Food Technology in Australia** 40(10); 1988; 403

This review discusses the role of the Omega-3 fatty acids in fish in preventing heart diseases from the point of view among industry and consumers. This covers the n-6 and n-3 fatty acids and their role, future for cardiovascular disease prevention, and practical implications. NGKR

Fish

714 Cho (S-Y), Miura (A), Fujimoto (K) and Inai (M). Improvement in oxidative stability of fish meal by addition of glucose via accelerated Maillard reaction. **Bulletin of the Japanese Society of Scientific Fisheries ('Nihon Suisan Gakkai-shi')** 54(6); 1988; 1017-1022

The oxidative stability of sardine meal and oil mixed with the stick water browned by the Maillard reaction was compared with that of the meal and oil supplemented with synthetic antioxidants such as BHA and ethoxyquin. Browned stick water was prepared by the reaction between added glucose and amino compounds in stick water at 80-120 C. The inhibitory effect was evaluated by measurement of oxygen absorption by fish meal or oil contained in a sealed flask and stored at 37 C in the dark. The ratio of oxygen/nitrogen in the head space of the flask was periodically determined by gas chromatography with a thermal conductivity detector. The antioxidative effect of stick water on fish oil and meal was remarkably enhanced with the progress of browning and nearly proportional to browning intensity. The oxidative stability of fish meal produced from press cake and the browned stick water with $E^{1\%}_{1}$ cm 0.28 at 420 nm was comparable to that containing 0.01% ethoxyquin. After the Maillard reaction, the content of histidine, the most abundant free amino acid, and histamine in stick water decreased significantly. The decrease of these two imidazole compounds is preferable because these can produce gizzerosine which strongly induces gizzard erosion in chicks. **AS**

715 Girija Menon (AV) and Balakrishnan Nair (R). Histological changes in fresh water fish muscle stored in chilled condition. **Journal of Food Science and Technology, India** 25(3); 1988; 167-169

Structural changes occurring in the skeletal muscle of the fish **Labeo calbasu**, a major carp, during ice storage were studied histologically. The muscle samples were examined in fresh fish and at the end of 7, 14 and 21 days of storage. Fresh muscle tissue showed closely packed uniform bundles of myofibrils, with well-defined striations and clearly visible nuclei. The connective tissues which cemented together the fibres and myotomes were also distinctly discernable. On storage, there was progressive disruption in this compact storage, there was progressive disruption in this compact picture, with deterioration of the organisation of the structure characterized by fissures and breaks in the fibres leading to dislocation and mutilation of myofibrils. Gaps appeared in areas originally occupied by connective tissues, suggesting major alterations or even disintegration of the latter. Such changes were in line with concomitant softening in the texture of the muscle observed in the stored fish. **AS**

716 Kalaimani (N), Gopakumar (K) and Unnikrishnan Nair (TS). Quality characteristics of cured fish of commerce. **Fishery Technology** 25(1); 1988; 54-57

The curing methods adopted at fish curing yards, fish market and dry fish godowns (in Quilon and Tuticorin, India) were studied to evaluate the quality of dried salted fish in relation to the water activity and spoilage. A total of 23 samples of different var. of fish collected from the markets and curing yards and 8 samples of anchovies collected from different godowns were analysed to evaluate. Out of 23 samples had moisture content of > 51% which is above the quality and fungal/insect infestation prescribed standards and are unacceptable after 3 wk storage. Unacceptability of the products was due to low salt content and high moisture levels. After 3 wk of storage about 70% of the samples were found unfit for consumption and 12.5% of the anchovy samples were found infested with beetle. Of the 23 samples, 6 samples that have affected with mould and fungus and water activity of 0.74-0.95 and among anchovies the water activity ranged from 0.63 to 0.82. MVG

717 Morishita (T), Uno (K), Matsumoto (Y) and Takahashi (T). Comparison of the proximate compositions in cultured red sea bream differing the localities and culture methods, and of the wild fish. **Bulletin of the Japanese Society of Scientific Fisheries ('Nibon Suisan Gakkai-shi')** 54(11); 1988; 1965-1970 (Ja).

Proximate composition in red sea breams cultured at various localities and cultured by different methods was compared; a comparison was also made between these fishes and wild ones. There were no appreciable differences in the crude protein and ash contents among the cultured fishes from various localities. The lipid content was higher in the ordinary meat of fatty fish and was twice that in the lean meat. On the otherhand, the difference in lipid content between these cultured fishes and wild ones was much higher; the content in cultured fishes even in the lean fishes, was 3.6 times higher than those in wild ones. There was little difference between the fishes fed on a fresh bait and those on a moist pellet except that the fishes cultured by feeding moist pellet had lower lipid contents in the viscera. The lipid content of fishes cultured at marifarm was lower, in meat of all regions of the yearling fish (0 age fish), than those of the net cages, but was unexpectedly higher in the dorsal and ventral meats in one yr old fishes. SGB

718 Nagakawa (T), Watabe (S) and Hashimoto (K). Identification of three major components in fish sarcoplasmic proteins. **Bulletin of the Japanese Society of Scientific Fisheries ('Nibon Suisan Gakkai-shi')** 54(6); 1988; 999-1004

Attempts were made to identify the native proteins ("43 K", "40 K" and "35 K" components) whose subunits appeared as three bands in SDS-gel electrophoretograms of sarcoplasmic proteins from each of red seabream. Pacific mackerel and carp ordinary muscle. Judging from gel filtration, behaviours on Sephadex G-150, along with subunit mol. wt. of and other properties, "43 K", "40 K" and 35 K" components were identified as creatine kinase aldolase and glyceraldehyde-3-phosphate dehydrogenase resp. Specific activity of creatine kinase ranged from 25.9 -33.3 units/mg through the three fish sp., whereas those of aldolase and glyceraldehyde-3-phosphate dehydrogenase were more sp.-specific, ranging from 12.4-32.3 and 28.0 -39.4 untis/mg, resp. Mol. wt. of isolated creatine kinase, aldolase and glyceraldehyde-3-phosphate dehydrogenase were determined to be 86,000-88,000, 160,000 and 136,000-140,000 resp. regardless of fish sp. AS

719 Nair (KKS) and Nair (RB). Bacteriological quality of fresh water fish from Krishnarajendra Sagar reservoir. **Fishery Technology** 25(1); 1988; 79-80

The bacteriological quality of fresh water fish, **Labeo rohita** and **L. calbasb**, from Krishnarajasagar near Mysore city, Karnataka, India were determined. The aerobic plate count (per g) ranged from 6.4×10^4 to 4.8×10^5 and coliforms from 120 to 9200. **E. coli** could be detected in 50% of the samples. No **Staphylococcus** were present in any of the samples and **Salmonella paratyphi** was detected in one sample of **L. rohita**. It was concluded that the microbiological hazard potential of this fresh water fish is low. MVG

720 Nakagawa (T), Watabe (S) and Hashimoto (K). Electrophoretic analysis of sarcoplasmic proteins from fish muscle on polyacrylamide gels. **Bulletin of the Japanese Society of Scientific Fisheries ('Nihon Suisan Gakkai-shi')** 54(6); 1988; 993-998

Sarcoplasmic proteins were extracted from the ordinary muscle of twelve sp. of marine and four sp. of freshwater fish. Disc-gel electrophoresis in the absence of SDS showed sp.-specific patterns, patterns of marine fish differed from those of the freshwater fishes. On the basis of patterns observed in the polyacrylamide slab gel electrophoresis in the presence of SDS, the fishes could be categorised into three groups; marine white-fleshed bottom fish (rich in 43 K and 35 K components), marine red fleshed pelagic fish (rich in 43 K, 40 K and 35 K components) and fresh water fish (rich in 43 K components). Red sea bream, pacific markerel and carp as representatives of the three groups were analysed for relative amounts of 43 K, 40 K and 35 K components in the sarcoplasmic proteins: 12.6, 13.7 and 13.5 % in red sea bream, 13.7 18.7 and 11.6% in pacific mackerel and 19.5, 12.3 and 10.7% in carp resp. SGB

721 Rosier (J) and Peteghem (CV). A screening method for the simultaneous determination of putrescine, cadaverine, histamine, spermidine and spermine in fish by means of high pressure liquid chromatography of their 5-dimethylaminonaphthalene-1-sulphonyl derivatives. **Zeitschrift fur Lebensmittel-Untersuchung und -Forschung** 186(1); 1988; 25-28

A simple and rapid method is described for the extraction, derivatization and subsequent detn. by means of high pressure liquid chromatography of putrescine, cadaverine, histamine, spermidine and spermine as their 5-dimethylaminonaphthalene-1-sulphonyl derivatives. The amines are extracted from the fish material by an aqueous trichloroacetic acid solution and derivatized by means of 5-dimethylaminoaphthalene-1-sulphonyl chloride (dansyl chloride). The reaction mixture is then injected on a RP-8 column using gradient elution to separate the amine derivatives. Use of the method results in a considerable saving with respect to both time and costs. AS

722 Sakai (M). Dehydration rates of fish flesh by expression. **Journal of Japanese Society of Food Science and Technology '(Nippon Shokuhin Kogyo Gakkaishi')** 35(9); 1988; 624-629 (Ja).

Dehydration rates of fish flesh by expression have been measured, under various conditions. Samples flesh was frozen-stored of river chum (**Oncorhynchus keta**) which had higher moisture contents than the same fish in ocean. Experimental results were compared with a rheological model. Voigt type 4-element-model, for deformation of visco-elastic materials. Model constants were determined for each run with a curve fitting method by substituting an amount of dehydration per cross-sectional area for that of deformation. By correlating these constants with operating variables, behavior of dehydration buried in large dispersion became clear as follows. Each voigt element played an important role in both early and later stage of dehydration. Although the observed dehydration rates were almost independent of pressure, model constants were strongly dependent on it. They were different in stages and pressure ranges. In early stage at higher pressure range, and in later stage except at transition range characteristics of the spring and the dashpot were observed. And these constants were inversely proportional to the initial sample wt. As a result, the model was applicable to the above regions. AS

723 Sanderson (K), McMeekin (TA), Indriati (N), Anggawati (AM) and Sudrajat (Y). Taxonomy of halophilic and halotolerant bacteria from Indonesian fish and brine samples. **ASEAN Food Journal** 4(1); 1988; 31-37

A study was made of 26 extremely halophilic and 21 moderately halophilic bacteria from Indonesian salted, dried chub mackerel and salting brines. The extremely halophilic isolates were identified as **Halobacterium salinarium** and **Halococcus morrhuae**. Gram positive isolates from the fish were identified as **Staphylococcus xylosus** and unidentified strains from the **S. saprophyticus** group. Gram negative moderate halophiles from the fish and brine exhibited many similarities to the genus **Halomonas**, but additional work is required to confirm the relationship. The types of bacteria isolated are similar to those that have been described in other geographical locations where fish are preserved by salting and drying. AS

724 Vareltzis (K), Zetou (F) and Tsiaras (I). Textural deterioration of chub mackerel (**Scomber japonicus collias**) and smooth hound (**Mustellus mustellus** L.) in frozen storage in relation to chemical parameters. **Lebensmittel-Wissenschaft und-Technologie** 21(4); 1988; 206-211

The fish samples did not show any noticeable changes in sensory attributes (appearance, odour, texture, flavour, and overall acceptability) for 8 wks storage at -22 C. Results also indicate that TBA contents combined with sensory attributes scores is a good indicator for grading the quality of frozen fish. BV

725 Wagner (H) and Rudek (JH). Optimum cutting method for heading of fish. **Lebensmittelindustrie** 35(1); 1988; 23-25 (De).

The increase of the yield of fish for human nutrition during fish processing by machines gets more and more importance. The yield is determined essentially by the cutting method used, which depends on the anatomy of the fish species. In the process of heading more fish flesh can be won by newly developed cutting methods. However, the programmable cutting method for heading requires the precise knowledge of the structure of head and gills. AS

726 Wray (T). Fish processing. New uses for enzymes. **Food Microstructure** 63(7); 1988; 48-49

Capelin

727 Aksnes (A). Location of enzymes responsible for autolysis in bulk-stored capelin (**Mallotus villosus.**) **Journal of the Science of Food and Agriculture** 44(3); 1988; 263-271

Severe autolysis may occur in bulk-stored raw material used for the production of fish meal and oil, especially when the content of feed in the gut is high. The autolysis was mainly due to solubilisation of muscle protein caused by proteolytic enzymes which leaked from the intestinal tract. These enzymes were of the trypsin type and accounted for about 70% of the total proteolytic activity in capelin with low gut content (5% of total fish wt.). Enzymes from stomach and intestines were of about equal importance. Enzymes located in the muscle, kidney or gonads made only a minor contribution to the total autolysis. Higher gut content (11% of total fish wt.) increased the proteolytic activity in the stomach and intestines and the autolysis of the capelin. Microbial proteolytic enzymes accounted for 20-30% of the total protein solubilisation. **AS**

Etroplus suratensis

728 Sreekumari (KR), Chandrasekharan (M) and Lakshmanaperumalsamy (P). Studies on lipolytic bacteria in stored fish **Etroplus suratensis** (Bloch). **Fishery Technology** 25(1); 1988; 64-68

The distribution of total heterotrophic bacteria (THB) and lipolytic bacteria in various regions (body surface, gill, intestine and flesh) of fish **Etroplus suratensis** (Bloch) during storage for 24 h at 28 plus or minus 2 C and 22 days at 4 C was studied separately. Of the different heterotrophic bacteria **Pseudomonas** dominated at 4 C whereas at 28 plus or minus 2 C and in fresh condition Vibrio, **Aeromonas**, and **Acinetobacter** dominated. Lipolytic activity was elaborated by the members of various genera and their activity varied in different lipid compounds (tributyrin, tween 80, tween 60, tween 40 and tween 20). Tributrin was utilized by majority of the isolates. All the selected isolates preferred a temp. of 35 C and pH 6.0 for their max. growth. **Aeromonas** and **Vibrio** showed max. growth at 0.5% NaCl concn while 3% NaCl was found to be optimum for **Pseudomonas**. **AS**

Hakes

729 Tejada (M) and Careche (M). Effect of frozen storage temperature (-12 and -18 C) on stability of minced hake muscle. **Revista de Agroquimica y Tecnologia de Alimentos** 28(1); 1988; 109-114 (Es).

The effect of two frozen storage temp. (-12 and -18 C) on stability of vacuum-packed minced hake muscle was studied. The formation of formaldehyde (FA) determined as dimethylamine (DMA) was related to, variations in protein solubility, apparent viscosity, emulsifying capacity and thiobarbituric acid (TBA), along the storage period (160 days). The effect of the higher temp. was most apparent as a decrease in viscosity; its effect on the other parameters was less noticeable. At both temp. the decrease in protein solubility and emulsifying capacity correlated very highly with the increase in DMA; however the apparent viscosity was greatly reduced when a threshold level of DMA was reached; TBA levels were the opposite of those expected for each temp., probably due to interferences by DMA and FA in the technique used to measure TBA values. AS

Pollack

730 Niwa (E), Wang (T-T), Kanoh (S) and Nakayama (T). Contribution of gelling substance to muscular protein network structure within Kamaboko. **Bulletin of the Japanese Society of Scientific Fisheries ('Nihon Suisan Gakkai-shi')** 54(6); 1988; 989-992

The thermal adhesion of various high polymers, to Alaska pollack shio-surimi was examined in order to elucidate the mechanism of their gel-strengthening action. A pellet or suspensions of the polymers was gently put on the shio-surimi and heated at 40 C for, 1h or 80 C for 40 min (for effecting the adhesion). The adhesive force, measured by stretching the adherent high polymers was greater in the case of soybean protein Al and vital wheat gluten, when the heat treatment was at 40 C and in the case of egg albumin when the heat treatment was at 80 C. In the case of agar, K carrageenan and corn starch, the force was less at both the temp. Considering the fact that these polysaccharides as well as the three proteins are effective gelling substance, the contribution of the gelling substance to the muscular protein network structure seems to be not indispensable for the gel-strengthening action. SGB

Psenopsis cyanea

731 Perigreen (PA), Joseph (J) and George (C). Studies on freezing and storage of **Psenopsis cyanea**. **Fishery Technology** 25(1); 1988; 44-46

The freezing and storage characteristics of **Psenopsis cyanea** caught on board from a depth of 350 m off Cochin (India) are reported. The fat content of the fish was high (15.58% on the wt of whole fish) and the meat was white in colour. Peroxide value, free fatty acids and thiobarbituric acid values were 28.82 mg. eq/kg of fish, 2.60% oleic acid and 2.90 mg malonaldehyde/kg after 36 wk of frozen storage and organoleptically the fish was acceptable upto 32 wk at -22 plus or minus 1 C. KAR

Puffer

732 Hwang (D-F), Noguchi (T), Arakawa (O), Abe (T) and Hashimoto (K). Toxicological studies on several spepcies of puffer in Taiwan. **Bulletin of the Japanese Society of Scientific Fisheries ('Nihon Suisan Gakkai-shi')** 54(11); 1988; 2001-2008

Forty-five specimens of four puffer sp. landed at fish markets in Taiwan were assayed for anatomical distribution of toxicity. "Dokusabafugu" **Lagocephalus lunaris** contained moderate amounts of toxin in almost all tissues, and the highest toxicity scores were 460 μ/g ovary, 380 μ/g intestine, and 100 μ/g muscle. In "Komondamashi" **Fugu alboplumbeus**, the highest scores were 180 MU/g ovary and 120 MU/g liver. "Takifugu" **F. oblongus**, whose toxicity data have not been available thus so far, was strongly toxic, the highest scores being 2,000 MU/g liver and 770 MU/g ovary. "Shippofugu" **Amblyrhynchotes hypselogenion** whose toxicity data were lacking was also strongly toxic. The highest scores were 750 MU g ovary and 720 MU/g liver. The toxin was partially purified from the toxic liver of each sp. by ultrafiltration using a Diaflo YM-2 membrane, followed by chromatography on Bio-Gel P-2. Analyses by electrophoresis, TLC, HPLC and GC-MS showed that the toxin from each sp. was composed of tetrodotoxin, anhydrotetrodotoxin and 4-epitetrodotoxin. In addition, a tetrodonic acid-like toxin was detected through the four sp. AS

Rohu

733 Balachandran (KK) and Vijayan (PK). Development of a process for canning fresh water fish rohu (**Labeo rohita**). **Fishery Technology** 25(1); 1988; 40-43

For proper canning of fresh water fish rohu (**Labeo rohita**), it was found necessary to cold blanch the skinless boneless meat in 15% brine containing 0.25% calcium chloride which imparts a firm texture. The quality of meat was impaired and the texture became more fiborus and the flavour was adversely affected if the concn. of CaCl is increased beyond 0.25%. It was found that heat processing for 25 min at 121 C yielded a product of desirable characteristics in OTS cans of 77 x 55 mm size. MVG

734 Joseph (J), Surendran (PK) and Perigreen (PA). Studies on iced storage of cultured rohu (**Labeo rohita**). **Fishery Technology** 25(2); 1988; 105-109

The biochemical, bacteriological and organoleptic changes in cultured rohu (**Labeo rohita**) during iced storage have been studied. Non-protein N decreased and water soluble N remained almost same during storage in ice. Initially, when the fish was in pre-rigor and rigor conditions, the extractability of protein was low (45 to 50%) which increased after the resolution of the rigor and the decrease in extractability towards the end of storage was insignificant. The total volatile base N remained steady upto 7 days in ice and showed slight decrease on further storage. During iced storage the bacterial count increased from 10^3 g to 10^5 g by the 11th day of storage. Nearly 80-90% of the bacterial population in fresh fish was mesophiles which decreased gradually (decreased to 1% by 13 th day of iced storage). Organoleptically the fish was acceptable upto 15 days in ice. AS

Sardines

735 Fujimoto (K), Endo (Y), Cho (S-Y), Watabe (R), Suzuki (Y), Konno (M), Shoji (K), Arai (K) and Saito (S). A new method for producing kamaboko from sardine meat powder by dehydration with a high osmotic pressure resin and defatting with liquified carbon dioxide. **Bulletin of the Japanese Society of Scientific Fisheries ('Nihon Suisan Gakkai-shi')**

54(6); 1988; 1071

High quality "surimi" production from sardine by removing oil and fishy odour with high pressure liquid carbon dioxide has been attempted. Dark meat containing large amount of fat, was removed. The washed meat was supplemented with sorbital and sodium pyrophosphate. This was further dehydrated to less than 30% water, using a high osmotic pressure resin, this was further milled and extracted with liquid carbon dioxide by a batch process. Kamaboko was prepared using mineral meat samples. The quality of kamaboko was not spoiled by the processing. Carbon doxide extraction was found to be effective in removing the peculiarly strong fishy odour of sardine meat. This dehydrated sardine mince showed good stabilities against oxidation and off-flavour. SGB

736 Hamada (M) and Kumagai (H). Chemical composition of sardine scale. **Bulletin of the Japanese Society of Scientific Fisheries ('Nihon Suisan Gakkai-shi')** 54(11); 1988; 1987-1992 (Ja).

Chemical composition of the scale of sardine **Sardinops melanosticta** was studied. The major components were found to be ash and a nitrogenous substance; ash and nitrogen contents were 53.16% and 7.38% resp., on dry wt. basis. Total sugars and crude lipid contents were low, 0.21% and 0.08% resp. Calcium, phosphorus and magnesium in 100 g crude ash were 39.39%, 21.08% and 2.08% resp. Sodium, potassium and some heavy metals were extremely low in content. Molar ratio of calcium to phosphorus was 3 to 2. Nitrogenous substance was mostly collagen, proved by the hydroxyproline content and also SDS polyacrylamide gel electrophoretic pattern; collagen content was about 43%. Both collagen and ash together amounted to 96% collagen in this scale was assumed to be type I and the migration rate of alpha 1 subunit of the collagen was almost the same as that of calf skin type I collagen, but that of alpha 2 subunit was slower than that of calf collagen. SGB

737 Kawai (Y) and Hatano (M). Curdling of emulsions stabilized by succinylated protein from sardine and ripening of emulsion curds. **Bulletin of the Japanese Society of Scientific Fisheries ('Nihon Suisan Gakkai-shi')** 54(6); 1988; 1027-1033 (Ja).

The total protein obtained from sardine was succinylated and the modified protein(SP) was used to manufacture cheese analog foods. Emulsions stabilized SP were curdled by lactic acid or glucono Delta-lactone (GDL), and pressed into cakes. The emulsions were stable during the acidification and pressing stages. Emulsification contributed to the whiteness and softness of the cakes. Rennin had a softening effect on the emulsion cakes. Emulsion cakes were inoculated with **Penicillium** sp. and ripened under the conditions of RH 86% at 15-20 C. **P. caseicolum** performed the most ripening of the curds, followed by **P. camemberti** and P. roqueforti. **P.caseicolum** made the cakes soft and brown because of its high protease and lipase activity, while in the case of **P. camemberti** and P. roqueforti, moderate ripening was observed. Nutritional value of curd protein ripened by **P. camemberti** was high as sardine protein. It is possible that cheese analogs made from fish protein may become a novel fermented food. AS

Sciaenids

738 Chakrabarti (R). A method to preserve fish muscle pieces and mince from Sciaenids. **Fishery Technology** 25(1); 1988; 58-60

Fish muscle pieces and mince from sciaenids were treated with (i) 8% NaCl and 0.25% sodium benzoate, (ii) 8% NaCl, 0.25% sodium benzoate and 0.5% potassium sorbate and (iii) 8% NaCl, 0.25% sodium benzoate, 0.5% potassium sorbate and 0.1% sodium bisulphite and stored at 34 plus or minus 5 C. Observations were made for changes in protein, total volatile basic N, alpha amino N, NaCl % and total bacterial count at 0, 24, 48 and 72 h of storage. Incorporation of 0.1% sodium bisulphite in the media slightly improved the texture and flavour of minced fish. It is concluded that fish muscle pieces and mince could be preserved for 72 h in (ii). Addition of bisulphite slightly improved the texture and flavour but shelf life was not improved. KAR

Silver pomfret

739 Sankar (TV) and Viswanathan Nair (PG). Effect of pre-processing iced storage on deteriorative changes in lipids of silver pomfret stored at -18 C. **Fishery Technology** 25(2); 1988; 100-104

Changes in quality of Silver pomfret (**Pampus argenteus**) frozen in fresh condition as well as holding in ice for one, two and four days was evaluated during storage at -10 C. The shelf life decreased sharply if the pre-freezing iced storage was more than one day. The shelf-life of one day, two day iced and four day iced frozen sample were 32, 20 and 16 wk. resp. There was no correlation between peroxide value and the organoleptic detection of rancid flavour. Free fatty acid levels were more in pomfret frozen after storage in ice for one day than in two or four day storage. MVG

Tunas

740 Chu (Y-J), Arakawa (N), Kurata (T), Matsubara (M) and Takuno (M). Effect of contact-dehydrating sheet treatment on the colour of bigeye tuna muscle. **Journal of Japanese Society of Food Science and Technology '(Nippon Shokuhin Kogyo Gakkaishi')** 35(9); 1988; 640-646.

A dehydrating device called contact-dehydrating sheet, is known to have an excellent capacity in dehydrating foodstuffs, when it comes in contact with them. The effect of sheet treatment on the colour of bigeye tuna muscle was studied. Samples of 1.5 cm thick were dehydrated by covering the sample slab with the sheet on the top side. After dehydrating for 5, 12h, 1, 2, 3 and 5 days at 3 C each of the samples slabs was sliced horizontally along the treated side into 3 layers of equal thickness. It was found that the distribution of water removal in tuna muscle was more uniform than what occurred in beef and this uniformity might be due to less adipose and connective tissues. The ratio of metmyoglobin formation in upper layer of dehydrated sample was the same with that of control and gradually increased with the prolonged treatment time. The iron content of samples rose from about 0.8 to 1.1 mg% during the 5 days period dehydration. However, there was not much difference in redness of bigeye tuna muscle with the controls at varied iron content in this range. This phenomenon was thought to be due to the particular pattern of colour (Mb) change in bigeye tuna muscle. This pattern was not significantly influenced by the formation of metmyoglobin. AS

741 Kai (N), Ueda (T), Takeda (Y) and Kataoka (A). The levels of mercury and selenium in blood of tunas. **Bulletin of the Japanese Society of Scientific Fisheries ('Nihon Suisan Gakkai-shi')** 54(11); 1988; 1981-1985

The levels of mercury and selenium in thirty blood specimens of two sp.of tunas, i.e., eighteen individuals of yellow fin **Thunnus albacares** and twelve individuals of big-eye **Thunnus obesus**, were presented. Mercury level and the ratio of methyl mercury content (MeHg) to total mercury content (T-Hg) in the blood were lowest in yellow fin and highest in big-eye, resp., as compared with those in the other tissues and organs previously reported. Both the mercury contents (T-Hg and MeHg) in big-eye were extremely high compared with those in yellow fin, and these contents in both sp. did not tend to increase with the growth of the fish. Selenium content (Se) in the blood was highest in all tissues and organs, and there was no significant difference in the high selenium levels between both sp. The molar ratio (Se/Hg) of Se to T-Hg in the blood was also highest in all tissues and organs, and correlated negatively with T-Hg in the blood of both sp. From the correlation, it was observed that yellow fin and big eye belong to the one region (low T-Hg and large Se/Hg) and to the other (high T-Hg and small Se/Hg), resp. AS

Yellow tail

742 Date (K) and Yamamoto (Y). Seasonal variations with growth in nutritive component in meat of cultured yellow tail **Seriola quinqueradiata**. **Bulletin of the Japanese Society of Scientific Fisheries ('Nihon Suisan Gakkai-shi')** 54(6); 1988; 1041-1047 (Ja).

The seasonal variations with growth in the proximate compositions and mineral contents of cultured yellow tail, **Seriola quinqueradiata** were, examined during a 20 month period from February, 1985 to November, 1986. The muscle of yellow tail was divided into four parts; dorsal, ventral, caudal, and dark muscles, and for each part the amounts of moisture, crude protein, crude lipid, ash, and 13 kinds of minerals were analyzed. The following results were obtained. The moisture content was higher in the caudal muscle than in the other parts. In all the muscles moisture contents tended to increase in the summer. Crude protein contents were slightly higher in one yr old fish than those in two yrs old. In lipid contents, there was a remarkable variation according to growth, and the lowest level was found in the summer. A negative correlation was noticed (n = 160, r = -0.692) between the contents of moisture and crude lipid. The seasonal variations in ash content in the dorsal, ventral caudal muscles were relatively slight. Seasonal variations of Ca, Na and K contents in the muscles were significant; values of P, Fe, K, Mg, Cu, and Mn in dark muscle were different considerably from those in other parts. Higher contents of Fe, Cu, and Mn were noticed in the dark muscle. Heavy metals such as Pb, Hg, and Cd in all the muscles tested were within the dietary safety levels. The mean value of the edible portion of all samples assayed during a 20 month period was as follows: moisture 55.3 g, crude protein 23.6 g, crude lipid 14.0 g, ash 1.8 g, Ca 3 mg, P 265 mg, Fe 1.1 mg, Na 26 mg and K 336 mg per 100 g. These results indicate that several components differ in value from those listed in the standard tables of food composition in Japan. **AS**

Molluscs

Clam

743 Goplakrishna Iyer (TS) and Varma (PRG). Isolation of **Salmonella agona** (4, 12: f, g, 5:-) from commercial frozen boiled clam meat. **Fishery Technology** 25(1); 1988; 81

Salmonella agona (4, 12: f, g, 5:-) was isolated from a commercial frozen sample of boiled clam meat (**Villorita cyprinoides** var. **Cochinensis**) processed in a factory at Cochin. This serotype has been earlier isolated once from a human source. Morphological, biochemical and serological properties of **S. agona** were elicited. The biochemical properties of **S. agona** were found to be similar to that of **Salmonella**. MVG

744 Varma (PRG), Iyer (TSG) and Mathen (C). Quality of commercial frozen boiled clam meat. **Fishery Technology** 25(1); 1988; 36-39

The bacterial quality and sand content of frozen boiled clam (**Katelysia opima** and **Villorita cyprinoides**) meat and the possible sources of contamination during different stages of processing were studied. Results showed that commercial frozen boiled clam meat belonging to the **Villorita cyprinoides** sp. collected from Cochin were highly contaminated with faecal indicator and pathogenic organisms than that belonging to the **Katelysia opima** sp. collected from Quilon. The total bacterial count was very high in **Villorita** sp. than that in **Katelysia** sp. The average sand content was 0.2536% and 0.625% (wet wt. basis average moisture 72-73%) in **Katelysia** and **Villorita** sp. resp. MVG

Cuttlefish

745 Joseph (J) and Perigreen (PA). Studies on frozen storage of cuttle fish fillets. **Fishery Technology** 25(1); 1988; 32-35

Cuttle fish (**Sepia aculeata**) were frozen in contact plate freezer at -40 C individually wrapped in polythene sheets, packed in carotons and stored at -20 plus or minus 1 C. The yield of fillets was 35% and the fillet had an average moisture content of 76.85%, and fat content of 0.82%. The salt soluble N of the fillets decreased from 85.1 to 35.36%., the non-protein N from 24-61 to 20.84% and alpha amino N from 252 to 140 mg/100g during storage at -20 plus or minus 1 C for 16 months. The initial white colour of the fillets showed signs of desiccation by 4 months storage which increased on further storage and finally became dull white with yellow decolouration inside. The texture of the cooked fillets changed from firm and chewy to rubbery with development of slight sweeteness at the end of 16 months. MVG

Squids

746 Castanon (CA) and Barral (AO). Sorption isotherms of raw squid (**Illex argentinus**) muscle. **Lebensmittel-Wissenschaft und-Technologie** 21(4); 1988; 212-215

Adsorption and desorption isotherms of squid muscle are determined at 5, 20 and 40 C temp Hysteresis is noted at 5 C but not at the higher temp. as reviewed. From the dependence of isotherms with temp. sorption isosteric heats are calculated by applying the Clausius clapeyron equation. The values as determined are higher than those noted in the corresponding literature for other fish species and beef meats. Through the B.E.T equations, mono-layer moisture contents are calculated for the isotherm zone corresponding to mono-mol. adsorption. **AS**

Prawns

747 Chakrabarti (R) and Choudhury (DR). Effect of liquid nitrogen freezing and subsequent storage on survival of **Staphylococcus aureus** and **Streptococcus pyogenes** in treated prawn meat. **Fishery Technology** 25(1); 1988; 61-63

Prawn meat treated with **Streptococcus pyogenes** B-49-2 culture and **Staphylococcus aureus** ATCC-12598-culture were frozen in plate freezer at -40 C and by spray type liquid N freezer and stored at -18 C. **Streptococcus pyogenes** B-48-2 showed low sensitivity to cold injury during freezing and frozen storage. **Staphylococcus aureus** ATCC-12598 survived during the entire storage period of 240 days. Total bacterial count of untreated prawn meat was found to be always lesser in liquid N frozen products than that in plate frozen products. **AS**

748 Lakshmanan (PT), Thomas (F), Varma (PRG) and Mathen (C). Comparison of sensory characteristics and biochemical parameters in commercial frozen prawns. **Fishery Technology** 25(1); 1988; 47-53

The sensory qualities of commercial frozen prawns of different forms, namely headless shell (HL), peeled (PUD) and peeled deveined (P & D) and grades were compared and correlated with certain biochemcial (moisture, total N, water extractable N, non-protein N, alpha amino N, total volatile N and trimethylamine N) and physical (cooked yield and pH), parameters. The order of preference of the sample were HL > PUD > P & D. There was significant correlation between sensory score of cooked sample, and water extractable N, non-protein N and alpha amino N values. Total volatile N and trimethylamine N did not exhibit any correlation with sensory score. The overall results showed that biochemical parameters, especially the levels of water extractable N, non-protein N and alpha amino N in commercial frozen prawns would greatly help to predict the equivalent sensory quality (flavour scores) on the basis of regression equation. MVG

Products

749 Niwa (E), Chen (E-S), Kanoh (S) and Nakayama (T). Effect of temperature on the state of water within Kamaboko. **Bulletin of the Japanese Society of Scientific Fisheries ('Nihon Suisan Gakkai-shi')** 54(11); 1988; 1975-1979

Effect of temp. on the state of water within the Kamaboko was examined in order to throw more light on the temp. dependency of its elasticity. On raising the temp., the length of the Kamaboko was almost unchanged and the wt. was slightly decreased. The electrostatic capacity and the expressible water increased. In the differential IR spectrum of the Kamaboko, a strong band due to free water was observed. On the other hand, micrographs of the Kamaboko subjected to higher temp. (25 to 80 C) showed that the network structure within the Kamaboko was broken. Based on the above results it could be concluded that the conversion of bound water to free water within the kamaboko caused the thermal decrease in the elasticity of the kamaboko. SGB

PROTEIN FOODS

Infant foods

750 Mrudula Kalpalathika (PV), Nunjundaswamy (AM) and Patwardhan (MV). Studies on canned strained baby foods based on vegetables. I. Carrots. **Journal of Food Science and Technology, India** 25(3); 1988; 137-141

A process for the preparation of canned strained carrot baby food (CBF) was developed. Thermal process time calculations indicated that processing for 59 min at 115.5 C was necessary to achieve commercial sterility. The canned product retained the original colour and flavour. Thermal processing caused a loss in ascorbic acid (17.5%), thiamine (69%), arginine (26.6%) and lysine (18.7%). CBF was found to be as effective as milk in promoting growth in young weaning rats. AS

ALCOHOLIC AND NON-ALCOHOLIC BEVERAGES

Alcoholic beverages

751 Funch (F) and Lisbjerg (S). Analysis of ethyl carbamate in alcoholic beverages. **Zeitschrift fur Lebensmittel-Untersuchung und -Forschung** 186(1); 1988; 29-32

752 Yen (G-C) and Chandra (T). Biogenic amines in alcoholic beverages produced in Taiwan. **Journal of the Science of Food and Agriculture** 44(3); 1988; 273-280

The biogenic amines tyramine, putrescine, cadaverine, 2-phenylethylamine, histamine and tryptamine were determined in 13 kinds of alcoholic beverages produced in Taiwan. They were derivatised with dansyl chloride and analysed using a high-performance liquid chromatographic method. Total amine content ranged from 0.23 to 11.4 µg^{-} ml^{-1} with Charng Chuen liqueur containing the highest level and Mei Kwei Lu the lowest. Tryptamine was found in all samples in amounts between 0.01 and 1.79 µg ml^{-1} . The levels of the other five amines in the tested samples were 0-7.0 µg ml^{-1} for 2-phenylethylamine, 0-3.0 µg ml^{-1} for putrescine, 0-2.9 µg ml^{-1} for cadaverine, 0-4.5 µg ml^{-1} for histamine, and 0-1.4 MUg ml for tyramine. These levels seem unlikely to have adverse effects on human health. AS

Beer

Brewing

753 Fenton (MS), Kavanagh (TE) and Clarke (BJ). Recent developments in brewing technology. **Food Technology in Australia** 40(4); 1988; 132-134, 148

This presentation highlights some of the newer development in brewing technology enabling brewers to combine efficiency with premium quality. This also covers the consumer demands for new speciality products such as low alcohol beers, development of new packaging methods and manufacturing methods. This review also discusses use of proanthocyanidin-free barley var. in order to reduce the tendency to have formation in beer, use of genetic engineering to incorporate desirable brewing characteristics into yeast strains without affecting their existing brewing characteristics. NGKR

754 Scott (RW). Automation in the brewhouse. **Food Microstructure** 63(7); 1988; 45-47

Wines

755 Enkelmann (R). Migration of heavy metals to Wine. Part 2. Charcoals. **Deutsche Lebensmittel-Rundschau** 85(2); 1988; 44-50

756 Lee (TH) and Baldwin (GE). Development in the production and consumption of sparkling wines in Australia. **Food Technology in Australia** 40(4); 1988; 138-139, 140

This article presents details of the manufacture and improvement of the quality of sparkling wine with special reference to bottle fermented sparkling wine. This covers definitions for sparkling wines in Australian sales and consumption, viticulture, winemaking and various steps involved in its manufacture. NGKR

757 Lonvaud-Funel (A) and Joyeux (A). A bacterial disease causing ropiness of wines. **Sciences des Aliments** 8(1); 1988; 33-49 (Fr).

758 Shamala (TR) and Sreekantiah (KR). Microbiological and biochemical studies on traditional Indian palm wine fermentation. **Food Microbiology** 5(3); 1988; 157-162

Microorganisms that are responsible in fermenting wild date palm (**Phoenix sylvestris**) sap into wine (toddy) were isolated and identified. **Saccharomyces cerevisiae**, **Schizosaccharomyces pombe**, **Acetobacter aceti**, **Acetobacter rancens**, **Acetobacter suboxydans**, **Leuconostoc dextranicum**, **Micrococcus** sp., **Pediococcus** sp., **Bacillus** sp. and **Sarcina** sp. were encountered in the freshly tapped sap. A majority of these microorganisms were also isolated from the traditionally fermented fresh toddy samples. In a comparitive study on the fermentation of fresh sap and fresh toddy, certain variations in the growth pattern of these microorganisms were noticed. In addition to this, the amount of ethanol, volatile acid, non-volatile acid and esters produced during these fermentations also varied. Data regarding the microbiological and biochemical changes that occur during fermentation of fresh sap and inoculated (field and lab.) saps are presented. AS

Non-alcoholic beverages

Coffee

759 Sivetz (M). Hi-speed computerized roasting systems from Neuhaus-Neotec. **Tea and Coffee Trade Journal** 160(6); 1988; 38-40

In this note larger fluid bed commercial coffee roasters based on Sivetz US patent of size varying between 1/2 kg to 3 kg capacity developed by Neuhaus-Neotec have been described. The advantages of this type fluid bed system is attributed to the high rate of heat transfer which results in short roast times without recourse to high circulatory air temp., e.g., 600 F. is usually tops for fast roasting. It allows accurate bean temp. readings unlike in rotary type roasters. It is also made possible to see both roasting and cooling inside chambers through slight glasses. Vented gases are allowed to pass through a catalyst bed before venting to atm. The other advantages of this fast roasting are higher yields and Robusta coffees are upgraded by this technique. These systems are also computer controlled. NGKR

Fruit juices

Grape juices

760 Sandhu (GS), Bawa (AS) and Bains (GS). Studies on the effect of variety, processing and storage on the quality of grape juice. **Indian Food Packer** 42(4); 1988; 36-42

Orange juices

761 Buchner (N) and Weber (H). Shelf life of orange juice in hypa-S-packages. **Flussiges Obst** 55(1); 1988; 14-16

Tea

762 Lee (S). Report suggests health advantages from imbibing tea and coffee. **Tea and Coffee Trade** Journal 160(6); 1988; 3-4

This review covers a preliminary report on the caffeine activity and the beneficial effect of tea and coffee beverage to reduce cardiac arrest due to the blood clot. It has been shown that normal blood also contains an enzyme called tissue plasminogen Activator (tpA) which prevents or reverses this effect and solublises blood clots. This enzyme tpA is being produced by biotechnical procedures. Another component of blood stream is shown to be Plasminogen Activator Inhibitor (PAI) which is also important. This interferes with tpA action in solubilising the blood clot. Normally these two enzymes are in balance preventing blood clots. The effect of caffeine has been shown to lower harmful PAI activity and raising desirable tpA concn. and thus reduce the occurrence of blood clots. It was shown that by caffeine intake PAI concn. decreased by half whereas the life saving liquifying enzyme tpA was doubled thus proving its beneficial effects in heart attacks and it could be a positive reason for seeking out caffeine beverages. NGKR

FATS AND OILS

763 Blankenhorn (I) and Niebergall (H). Chemical behaviour of thiodiethylene-glycol-bis-Beta-aminocrotonate in triglycerides and oils. **Deutsche Lebensmittel-Rundschau** 85(2); 1988; 40-43

764 Kyotani (S), Fukuda (H), Morikawa (H) and Yamano (T). Kinetic studies on the interesterification of oils and fats using dried cells of fungus. **Journal of Fermentation Technology '(Hokko Kogaku Zasshi')** 66(1); 1988; 71-83

The kinetics of the enzymatic interesterification of oils and fats, using acetone dried cells of **Rhizopus chinensis** as a lipase catalyst, have been investigated in a batch operation. To clarify the mechanism of this reaction, several models are discussed under various conditions in terms of the ratio of triglyceride (TG)/fatty acid (FA) and of the water content. First, in the reaction between olive oil and methyl stearate, the parameters involved in each model were determined by the trial-and-error method so as to make the calculated results fit with the experimental data. Then, the methods were compared with the experimental data obtained from the reactions with a mixture of stearic and palmitic acid methyl esters, where the proportions of TG/FA and water content were varied. From the results, the model based on either first order kinetics or on the formation of the glyceride-enzyme complex was confirmed to fit best with the data under a wide range of reaction conditions. This suggests that the fatty acid moiety of TG seems to be exchanged through the glyceride-enzyme complex in the enzymatic interesterification of oils and fats. AS

Fats

Fatty acids

765 Vijayalakshmi (P), Subbarao (R) and Lakshminarayana (G). Hydrogenation of unsaturated fatty acid methyl esters using decalin for hydrogen transfer. Journal of the American Oil Chemists" Society 65(6); 1988; 939-941

• A lab. procedure was developed for hydrogenation of methyl esters of unsaturated fatty acids using decalin as a hydrogen-transfer agent and 10% Pd/C as catalyst. The esters of 10-undecenoic, oleic, elaidic, stearolic, linoleic, cycloaliphatic C_{21} di-, C_{22} tri-, C_{26} dicarboxylic acids, and a mixture of hydnocarpic, chaulmoogric and gorlic acids were hydrogenated. Chromatographic and spectral analyses showed complete saturation. This procedure is simple, requiring no external source of hydrogen. AS

Oils

766 Ayorinde (FO), Clifton (JJr) and Afolabi (OA). Rapid transesterification and mass spectrometric approach to seed oil analysis. Journal of the American Oil Chemists" Society 65(6); 1988; 942-947

Fatty acid composition of seed oil is determined in less than one h using a quantitative one-vial technique. The method of analysis requires alcoholic solutions of sodium methoxide mild enough for epoxy and polyunsaturated oils. Separation and characterization of component fatty acids were accomplished by high resolution gas chromatography mass spectrometry. Using this method, Vernonia galamensis seed oil is shown to contain 79-80% vernolic (cis 12, 13-epoxy-cis-9octadecenoic) acid. Amaranthus cruentus, a West African vegetable crop, is shown to contain 17.3% palmitic acid, 3.2% stearic acid, 22.7% oleic acid, 54.7% linoleic acid and 2.1% linolenic acid. AS

767 Murthi (TN), Sharma (M) and Devdhara (VD). High pressure, liquid chromatographic determination of argemone oil in edible oils. Journal of Food Science and Technology, India 25(3); 1988; 170-172

A rapid liquid chromatographic method has been developed for the detn. of argemone oil in groundnut and mustard oils. This is based on the appearance of a peak with 3 min R_T for sanguinarine using a Zorbax silica column and a fluoresence detector. Argemone oil in edible oils at as low as 20 p.p.m. can be determined. AS

768 Sivakumaran (K) and Goodrum (JW). Laboratory oilseed processing by a small screw press. Journal of the American Oil Chemists" Society 65(6); 1988; 932-935

Applicability of the small screw press as a lab. tool in processing oilseeds was investigated. The meal and oil produced from peanuts in a small press were physically characterized. A simple set of standards was established for relating the oil extraction efficiency and the meal oil content to the physical and visual qualities of the meal produced. This will assist a researcher in maintaining in-process control of the quality of screw press products. These standards were used to identify the conditions of max. peanut oil recovery. Results with screw pressing of peanuts are compared to studies of other oilseeds. AS

Cassia seed oils

769 Daulatabad (CD), Hosamani (KM) and Mirajkar (AM). **Cassia siamea** seed oil. A minor source of vernolic and cyclopropenoid fatty acid. **Journal of the American Oil Chemists" Society** 65(6); 1988; 952-953

Cassia siamea Lam., Syn. **Senna siamea** (Lam.) H. Irwin & Barneby, is a large ornamental tree indigenous to India. The flowers are used as a vegetable. The pods and leaves contain toxic alkaloid. This sp. is used as one of the hosts for the lac insect (1). The present paper describes the occurrence of cernolic and cyclopropenoid fatty acids along with usual fatty acids. This is the first report on this seed oil. AS.

Mustard oils

770 Szakacs-Dobozi (M), Halasz (A), Kozma-Kovaes (E) and Szakacs (G). Enhancement of mustard oil yield by cellulolytic pretreatment. **Applied Microbiology and Biotechnology** 29(1); 1988; 39-43

One part by wt. of finely powdered expeller cake from brown mustard seeds (**Brassica juncea**) was mixed well with 2.5 parts by wt. of water and, after addition of 0.2% Celluclast$_{TM}$ (NOVO Industry A/S, Bagsvaerd), the mixture was allowed to stand at 20 C, 35 C, or 50 C, for 2h. The enzymatic breakdown was followed using a reductometric method. The mixture was then mixed well with one part by volume of water, the temp. was rapidly raised to 100 C, and the volatile oil was recovered by steam distillation. The yield of the resulting oil from ground samples was approx. 50% higher than that obtained without cellulolytic pretreatment at 35 C. Grinding of the expeller cake enhanced enzymatic digestion. The allyl isothiocyanate content of the oil was estimated by titrimetric and gas-chromatographic methods. AS

Rapeseed oils

771 Wijesundera (RC) and Ackman (RG). Evidence for the probable presence of sulphur-containing fatty acids as minor constituents in canola oil. **Journal of the American Oil Chemists" Society** 65(6): 1988; 959-963

Three isomeric epithio stearic acids have been concentrated as possible minor sulphur-bearing components of unprocessed canola oil. Chromatographic and mass spectral evidence is presented in support of these novel fatty acid structures, tentatively identified as isomeric 9, 12; 8, 11; and 7, 10 epithio stearic acids, each with a methyl substituent on the ring. AS

Rapeseeds oils

772 Fattori (M), Bulley NR) and Meisen (A). Carbon dioxide extraction of canola seed. Oil solubility and effect of seed treatment. Journal of the **American** Oil Chemists" Society 65(6); 1988; 968-973

The oil solubility in carbon dioxide was found to be strongly dependent on pressure of the gas and not on the system temp. The amount of oil extractable from flaked and cooked seeds was comparable to that recoverable by conventional hexane extraction. MNK

Sunflower oils

773 Robertson (JA), Lyon (BG), Morrison (WH) and Miller (JF). Sensory and chemical evaluation of stored oil-roasted high oleic nonoil sunflower kernels. Journal of the **American** Oil Chemists" Society 65(6); 1988; 985-989

Confectionery grade sunflower kernels were oil-roasted at 180 C and then stored at 27 C for up to 26 wks. Fatty acid composition of the oils extracted from the samples and sensory analysis were carried out at 2-4 wks intervals. MNK

SPICES AND CONDIMENTS

Spices

774 Blank (G), Akomas (G), Henderson (M) and Zawestowski (J). Heat sensitization of Bacillus subtilis spores by selected spices. Journal of **Food Safety** 9(2); 1988; 83-96

Heat treatment at 80 C for 10 min of all spices-spore mixtures (0. g spices /0.1 g spores) in distilled water (9 ml) reduced initial counts (10^6 ml) by approx. 0.5-1.0 logarithms, with exception of garlic which showed no effect. KMA

775 Farkas (J) and Andrassy (E). Comparative analysis of spices decontaminated by ethylene oxide or gamma radiation. **Acta Alimentaria** 17(1); 1988; 77-94

The results of the experiments can be summed up as follows. 4 kGy was sufficient to achieve reduction of the viable cell count equivalent at least to the effect of ethylene oxide. The residual cell count in the samples treated with 8 kGy radiation dose was 1-3 orders of magnitude lower than that of the ethylene oxide treated samples. Gamma radiation reduced sufficiently the cell count in the spices without affecting their sensory quality or other quality characteristics. Ethylene-oxide treatment, when carried out according to industrial practice, caused a substantial reduction of the volatile oils in black pepper. The ethylane oxide-treated black pepper showed in the initial phase of after-treatment storage a reduced seasoning capacity in comparision to the untreated samples, while in garlic powder the same treatment caused reduction in the aroma intensity. Flavour dilution profile analysis showed more change in the taste components of the seasoning after ethylene oxide treatment than after radiation treatment. However, the effect of storage on the flavour profile was more intense than that of cell count reducing treatments. According to the flavour dilution profile analysis the intensity of the sweet component of onion flavour was increased by both storage and radiation treatment Radiation treatment significantly increased also the water uptake of onion powder. The study has shown radiation treatment to be competitive with ethylene oxide treatment from the point of view of microbiological efficacy as well as in maintaining the quality characteristics of seasoning. AS

776 Hirosue (T), Matsuzawa (M), Irie (I), Kawai (H) and Hosogai (Y). On the antioxidative activities of herbs and spices. **Journal of Japanese Society of Food Science and Technology '(Nippon Shokuhin Kogyo Gakkaishi') 35(9)**; 1988; 630-633 (Ja).

The antioxidative activities of water, ethanol and diethyl ether extract obtained from 48 herbs on methyl linolenate were investigated in comparision of BHA. The results indicated the presence of strong antioxidative substance in ethanol extracts obtained from boldo, catnip, white oak and tonka beans, in water extracts obtained from white oak and in diethylether extracts obtained from boldo, penny royal and white oak. AS

777 Tiwari (R), Singh (KN), Sone Lal Girish GK). Studies on the efficacy of asafoetida (Hing) against insect pests of stored spices. **Bulletin of Grain Technology 26(2)**; 1988; 165-166

In the study ten adults and larvae of L. serricorne (F) were released separately in specimen tubes containing 5 g of good seeds of Dhania Coriandrum satium) mixed with dust of asafoetida at 0.5, 1.0, 2.0 and 3.0% levels. These tubes were kept at room temp. for 4 months. Results showed that 2.0% conc. of asafoetida is quite effective against the adults of L. serricorne as the % of damaged grains of Dhania in treated samples was 2.75 against 21.5 observed in control. NGKR

Chillies

778 Aczel (A). Application of overpressure layer chromatography in red pepper analysis. Study of the carotenoids giving the red colour of ground red pepper. **Acta Alimentaria 17(1)**; 1988; 37-41

An overpressure layer chromatography apparatus made on the basis of a Hungarian patent was used to examine the carotenoid composition of red pepper and of the millings prepared from it. Overpressure layer chromatography was found to ensure a more selective separation of the carotenoids and a possibility of their more exact evaluation than traditional layer chromatography. Quantitative detn. was carried out photometrically after scraping off and extracting the spots. About 92 to 98% of the carotenoids examined was recovered by the method used. In the case of the paprika var. cultivated on the largest scale it was possible to follow up the change of chloroplast pigments into chromoplast pigments during ripening. It was established that during ripening the amount of capsanthin and capsorubin decisively affecting the colour of red pepper continuously increased. In the ripe stage the red pigments form about 60% of the total colouring substance content and of these about 54% is provided by capsanthin. AS

Essential oils

779 Anon. Application of gas-liquid chromatography to the analysis of essential oils Part XIV. Monographs for five essential oils. **Analyst** 113(7); 1988; 1125-1136

Fingerprint tracings for essential oils of caraway (Netherlands), cordamom (Guatemala), celery (India), netmeg (Sri Lanka) and Pimento berry (West Indies) are presented. Analysis was carried out using polyethylene glycol 20 M and methyl polysiloxane stationary phases. The identification of components of the oils and their relative peak area percentage was carried out using coupled GC-MS. All the GC chromatograms are given in the paper. N

Ginger

780 Datkhile (RV) and Dethe (MD). Harvest-time residues of BHC in ginger and soil. **Pesticides** 22(10); 1988; 35-36

Dipping seed rhizomes of ginger in 0.4% BHC suspension and three soil applications of 10% BHC after planting at the rate of 7 kg/ha was found to be safe as the residue level left in the ginger was less than the tolerance limit, when estimated by colorimetric method. Residue impact ranged from 0.2 to 0.4 p.p.m. in rhizomes. NGKK

Pepper

781 Mathai (CK). A modified extraction and estimation method of oleoresin and piperine in black pepper (**Piper nigrum L.**) berries. **Indian Spices** 25(2-3); 1988; 3-5

Three methods, modified cold percolation method, Soxhlet method and conventional cold percolation method, for the estimation of oleoresin in black pepper berries were tried. The modified percolation method was found most efficient due to consistent results followed by soxhleting. The piperine content of the oleoresin estimated by modified cold percolation was very much higher compared to the other methods. This could be due to the complete extraction and also the prevention of losses during the process of extraction and estimation. MVG

Turmeric

782 Sampathu (SR), Krishnamurthy (N), Sowbhagya (HB) and Shankaranarayana (ML). Studies on quality of turmeric (**Curcuma longa**) in relation to curing methods. **Journal of Food Science and Technology, India** 25(3); 1988; 152-155

Dried turmeric fingers obtained under farm-processing conditions by three different treatments viz. water-cooking, alkaline water-cooking and traditional processing, were similar in quality with respect to drying characteristics, appearance, colour and oleoresin contents. Cooking and/or slicing helped to drastically reduce the drying period. Sun-dried fingers were bold in appearance, while mechanically dried fingers were shrivelled; however no difference in colour content was observed between them. Colour retention was better in mechanically dried uncooked slices than the conventionally cooked and sun-dried fingers. In lab. trials, where the material to alkaline water ratio was higher (1:3) the loss of colouring matter was about 6% in contrast to negligible losses in farm trials where the ratio was lower (0.33). The extractability of colouring matter with acetone was significantly higher (92.94%) in uncooked samples than in conventionally cooked samples (76-84%). AS

SENSORY EVALUATION

783 Neumann (R). Standardization of the sensoric food analysis - Present status and trends. **Lebensmittelindustrie** 35(1); 1988; 20-22 (De).

The tasks of standardization are deduced from the requirements of the co-operation in the field of the development of foodstuffs, auxillary and additional materials and from the exchange of goods planned between the CMEA countries. So the Standing Commission of the Food Industry of the CMEA have decided to treat subjects in standardization in the field of the sensoric analytics according to plan. Fundamentals for choice, qualification and work of the judges as well important suppositions of the mutual acknowledgement of the test results were provided by the present, already worked out CMEA standards about sensoric food control. AS

784 Watse (M) and Nishinari (K). The effect of monovalent cations and anions on the rheological properties of Kappa-carrageenan gels. Journal of Texture Studies 19(3); 1988; 259-273

The change in dynamic Young's modulus E' and in vol. of 2% and 4% Kappa carrageenan gels induced by immersion in alkali metal salt solutions was observed for various kinds of salts, LiCl, NaCl, KCl, CsCl, LiBr, NaBr, KBr, CsBr, NaI, KI, CsI, and for various salt concn. E' of the gels increased rapidly upto 1h after immersion, and then it increased more gradually. However, E' decreased after a certain immersion time when the concn of the salt exceeded a certain value which depends on the kind of the salt. The volume of the gel immersed in salt solutions for 24 h decreased with increasing concn. of the salt except in the case of NaI where the gel swelled remarkably. AS

FOOD STORAGE

785 Thakre (ED) and Bansode (PC). Farm level storage structures and losses estimated in stored foodgrains in Jabalpur District (M.P.). Bulletin of Grain Technology 26(2); 1988; 167-168

A survey was conducted in Jabalpur District of M.P. (India) to ascertain the extent of losses to stored food commodities and storage practices followed by the farmer. Information collected from 125 farmers of 22 selected villages was analysed and it is evident that nearly 5% of total quantity of stored food grains is lost during storage. Only a few farmers (3%) used good (pucca) storages whereas majority (73%) used traditional storage structures like earthen pots and banda. Necesssity was seen to popularise modern storage structures which alone can help reducing the food losses at farm level and by making earthen pots reasonably air tight to prevent moisture migration. NGKR

INFESTATION CONTROL AND PESTICIDES

Nil

infant and adult mice. **Journal of Food Safety** 9(2); 1988; 119-123

Yersinia enterocolitica heat-stable enterotoxin was partially purified by ion exchange gel filtration and fast protein liquid chromatography. Infant mice given YST orally (P.O.) exhibited diarrhea 4h after administration; a few infants died by 6.5 h. Pufs dosed intraperitoneally (i.p.) and adults dosed p.o. i.p: and intravenously showed no symptoms during the 7 days of observations. KMA

Thioproline

794 Tahira (T), Ohgaki (H), Wakabayashi (K), Nagao (M) and Sugimura (T). The inhibitory effect of thioproline on carcinogenesis induced by N-benzylmethylamine and nitrite. **Food and Chemical Toxicology** 26(6); 1988; 511-516

Thioproline, which is readily nitrosated to form nitrosothioproline, is expected to act as a nitrite scavenger. The effect of thioproline as an inhibitor of the carcinogenesis induced by N-nitroso-N-benzylmethylamine precursors was examined. Two groups of male F-344 rats were given diet containing 0.25% N-benzylmethylamine (group I) or 0.25% N-benzylmethylamine plus thioproline (0.25% until wk 17 and then 0.5% group II). Both groups were given drinking water containing sodium nitrite (0.1% until wk 17 and then 0.2%). The experiment was continued for 717 days. Squamous cell carcinoma of the fore stomach developed in six out of seven rats in group I and in significantly fewer, two out of nine rats, in group II. The degree of invasions by the tumours was also less in groups II rats, given thioproline, than in group I. Thus thioproline suppressed carcinogenesis induced by N-benzylmethylamine and nitrite, possibly by inhibiting the **in vivo** nitrosation of N-benzylmethylamine. AS

FOOD LAWS AND REGULATIONS

795 Jacob (M). Regulation of water quality for the food industry. **British Food Journal** 90(3); 1988; 114-116

Covers food legislation and water, scope of food businesses, chemical contamination, water-borne food taints, sampling for microbiological quality and food premises with private water supplies. BV

STATEMENT ABOUT "FOOD TECHNOLOGY ABSTRACTS"

FORM IV

Under Rule 8 of the Registration of Newspapers (Central Rules 1956)
(See Rule 8)

1. Place of Publication : MYSORE

2. Periodicity of its publication : Monthly

3. Printer's Name : Director, CFTRI, Mysore
   Nationality : INDIAN
   Address : DIRECTOR
   CENTRAL FOOD TECHNOLOGICAL
   RESEARCH INSTITUTE
   MYSORE - 570 013.

4. Publisher's Name : Director, CFTRI, Mysore.
   Nationality : INDIAN
   Address : DIRECTOR
   CENTRAL FOOD TECHNOLOGICAL
   RESEARCH INSTITUTE
   MYSORE - 570 013.

5. Editor's Name : K.A. RANGANATH
   Nationality : INDIAN
   Address : CENTRAL FOOD TECHNOLOGICAL
   RESEARCH INSTITUTE
   MYSORE - 570 013.

6. Name and address of individuals who own the newspaper and partners or shareholders holding more than one percent of the total capital : DIRECTOR
   CENTRAL FOOD TECHNOLOGICAL
   RESEARCH INSTITUTE
   MYSORE - 570 013.

I, B.L. Amla, hereby declare that the particulars given above are true to the best of my knowledge and belief.

B.L.AMLA
PUBLISHER

BIOCHEMISTRY AND NUTRITION

Biochemistry

Tocopherols

786 Pongracz (G). Heat stability of tocopherols. FAT Science and Technology 90(7); 1988; 247-251 (De).

The tocopherols are very important biological and nutritive components of our food. Furthermore, they are also antioxidants. The tocopherols are not volatile substances (such as e.g BHA and BHT) and they don't cause off-flavour (TBHQ) or colour (lecithin) at higher temp. therefore, they can be used for stabilisation of frying fats. The stability of tocopherols at 180 C is relatively good and it depends on the kind of fat. The heat stability of tocopherols is mostly higher in fats with higher iodine value. AS

Nutrition

787 Gray (M). Diet and intelligence. Food and Chemical Toxicology 26(6); 1988; 572-573

TOXICOLOGY

788 Furst (P), Furst (C) and Groebel (W). A GC-MS method for the determination of clenbuterol residues in food-stuffs, feeding-stuffs and urine. Deutsche Lebensmittel-Rundschau 85(2); 1988; 35-39

789 Parsons (JR), Sijm (DTHM), Van Laar (A) and Hutzinger (O). Biodegradation of chlorinated biphenyls and benzoic acids by Pseudomonas strain. Applied Microbiology and Biotechnology 29(1); 1988; 81-84

A Pseudomonas strain able to grown on biphenyl and 2- and 4-chlorobiphenyl has been isolated from soil. Benzoate-grown cultures of this strain were able to cometabolize other chlorobiphenyls to the corresponding chlorobenzoates. In contrast to most of the chlorobiphenyl-degrading strains described previously in the literature, which are reported to form chlorobenzoates as end metabolites from chlorobiphenyls, this strain is also able to further cometabolize chlorobenzoates to form ring-cleaved compounds. AS

Colourants

Dyes

FD & C Yellow

790 Borzelleca (JF) and Hallagan (JB). Chronic toxicity carcinogenicity studies of FD & C Yellow No. 5 (tartrazine) in rats. Food and Chemical

Toxicology 26(3); 1988; 179-187

FD & C Yellow No. 5 was fed to Charles River CD rats as a dietary admixture in two long-term toxicity/carcinogenicity studies. The studies were conducted with an in utero phase in which the compound was administered to the F generation rats (60/sex/group) at levels of 0.0, 0.0, 0.1, 1.0, or 2.0% (original study) and 0.0 or 5.0% (high-dose study). The concurrent control/groups received the basal diet. After random selection of the F animals, the long-term phase was initiated using the same dietary levels with 70 rats of each sex/group, including the three control groups. The max. exposure to the colouring was 113 and 114 wk for males and females resp. in the original study and 122 and 125 wk for males and females, resp., in the high-dose study. No compound-related effects were noted. The no-adverse-effect level found in this study was 5.0% in the diet providing an average intake of 2641 and 3348 mg/kg/day for male and female rats, resp. AS

FD & C Yellow

791 Borzelleca (JF) and Hallagan (JB). A chronic toxicity/carcinogenicity study of FD & C Yellow No. 5. (tartrazine) in mice. **Food and Chemical Toxicology** 26(3); 1988; 189-194

Charles River CD-1 mice were fed FD & C Yellow No. 5 in the diet at levels of 0.0, 0.0, 0.5, 1.5, or 5.0% in a long-term toxicity/carcinogenicity study. Each group consisted of 60 males and 60 females. Max. exposure was 104 wk for both males and females. No consistent, significant compound-related adverse effects were noted. The no-observed-adverse effect level established in this study was 5.0% (8103 mg/kg/day and 9735 mg/kg/day for male and female mice, resp.). AS

Microorganisms

Bacteria

Staphylococcus

792 Bennett (RW) and Archer (DL). Modified procedure to eliminate elution of food proteins during seroassay for Staphylococcal enterotoxins. **Journal of Food Safety** 9(2); 1988; 135-143

The effect of two sodium phosphate-sodium chloride buffers (0.2 m, pH 7.4 and 0.05 m, pH 6.5) on the separation of Staphylococcal enterotoxins from soluble proteins in foods were examined by ion exchange chromatography. The microslide gel diffusion test by which recovery was determined was more accurately interpreted when lower ionic strength buffer was used. KMA

Yersinia enterocolitica

793 Behling (AR), Berry (JT) and Taylor (SL). Toxicology and histopathology of the heat stable enterotoxin of **Yersinia enterocolitica** in

GENERAL

796 Beard (TD). Food production implementing quality controls. **Activities Report** 40(2); 1988; 32-38

797 Eadon (KB). Anticipated changes in consumer attitudes and eating patterns in fast food restaurants in the coming decade. **Activities Report** 40(2); 1988; 72-74

798 Elia (JG). Tracking quality to the consumer. **Activities Report** 40(2); 1988; 39-44

799 Fleming (HE). Effectiveness of British Military Food Service lessons learned from the Falkland Campaign. **Activities Report** 40(2); 1988; 20-24

800 Goud (JV). Strategies for food production to meet the challenges of 21st Century. **Agricultural Situation in India** 43(6); 1988; 505-506

801 Mc Masters (TL). Role of nongovernment standards in assuring food quality and availability. **Activities Report** 40(2); 1988; 51-54

802 Meiselman (HL). Product development-designing it right. **Activities Report** 40(2); 1988; 25-31

803 Mitchell (GE). Review of methods for the detection of irradiated foods. **Food Technology in New Zealand** 23(5); 1988; 28-30

This paper reviews some of the potential methods for identification of irradiated foodstuffs. It covers requirements for a detection method, changes produced in food by irradiation, electrophoretic patterns and gel chromatography of proteins, measurements of free radicals, spectrophotometry; chemiluminescence and thermoluminescence, measurement of carbonyl compounds, measurement of conductivity, formation of specific chemicals, formation of radiolytic hydrocarbons, formation of deoxycompounds, effect on enzymic activity, microbiology and conclusions. NGKR

804 Panyko (F). Influence of demographics on foods and feeding in the coming decade. **Activities Report** 40(2); 1988; 55-59

805 Popper (RD). The bottom line. Improved consumption of military rations. **Activities Report** 40(2); 1988; 45-50

806 Wallace (JR). Institutional food systems evolving in the coming decade. **Activities Report** 40(2); 1988; 78-85

FOOD PROCESSING

Nil

FOOD PACKAGING

807 Azzi (A), Valletrisco (M) and Niola (I). Ecological packing for foods. An essay to appreciate their degradability. **Industrie Alimentari** 27(258); 1988; 249-252 (It).

The interest in the problem of plastic residues has led some mayors to forbid their use for packing, advancing the law application (D.M 21-12-84 - art 15). By that, the industries have put on the market photo-biodegradable products which can be later digested by microorganisms. In the present study some bags for foods, named ecological are examined to control their conformity to the requested properties. AS

808 Gilbert (SG). The future of food packaging. **Activities Report** 40(2); 1988; 60-65

809 Stehle (G). Trends in the packaging of milk products and fruit juices. **Flussiges Obst** 55(11); 1988; 606-608 (De).

Packaging materials

Plastics

810 Farrell (CJ) and Organ (JR). Shelf stable plastic package options for the microwave. **Activities Report** 40(2); 1988; 66-71

FOOD ENGINEERING AND EQUIPMENT

Engineering

811 Awonorin (SO) and Lamp (J). Heat transfer coefficient for nitrogen droplets film-boiling on a food surface. **International Journal of Food Science and Technology** 23(4); 1988; 391-401

A method of measuring heat transfer rates from a solid food surface to liquid N droplets on it has been developed using 0.5 sec. repeat shot photography. It was seen that droplet diameters were varied from 0.1 to 2.5 mm and food surface temp. varied from 0, + 30 to - 100 C and all these measurements were carried out at atm. pressures. The mean heat transfer coeff. were determined using an energy balance for the droplets and the results proved significant for food freezing by liquid N sprays. NGKR

812 Chen (CS). Water activity change in aqueous solutions at subfreezing temperatures. **Lebensmittel-Wissenschaft und-Technologie** 21(5); 1988; 256-258

The phenomenon of reduced vapour pressures of ice and supercooled water was analyzed by the principles of analogy. Observations on water activity change at temp. 0 to -50 C can be described by the exponential law of decay. The rate of water activity change with respect to temp. lowering is 0.0097 C^{-1}. This rate constant is applicable to freezing of aqueous solutions which include non-electrolytes, acid, bases, and salts. A three dimensional activity concn.-temp. (ACT) diagram is developed. AS

Drying

813 Tosi (E), Masciarelli (R), Tapiz (L) and Ciappini (M). Grain drying in fluidized bed. Hydrodynamic study of soybean, sorghum and triticale beds. **Revista de Agroquimica y Tecnologia de Alimentos** 28(2); 1988; 221-232 (Es).

In soybean, sorghum and triticale fluidized beds, the pressure drop in incipient fluidizing conditions was calculated with the Ergun's equation modified by introduction of the sphericity concept. The deviations between calculated (Delat Pt) and experimental (Delat Pe) values were important, ranging the relationship Delta Pe/Delta Pt between 1.07 and 2.60. With the aim of obtaining basic information for fluidized driers design, new modification of the Ergun's equation in order to be applied to soybean, sorghum and triticate, resp. were developed. With the proposed equations the relationship Delta Pe/Delta Pt stays between 0.93 and 0.99. AS

ENERGY IN FOOD PROCESSING

Nil

FOOD CHEMISTRY AND ANALYSIS

Chemistry

814 Petriella (C), Chirife (J), Resnik (SL) and Lozano (RD). Correlation between induction time and rate of browning in heated model solutions of glucose and lysine. **International Journal of Food Science and Technology** 23(4); 1988; 415-418

815 Ru Duo Huang and Feather (MS). ^{13}C NMR study of some Maillard reaction products arising from D-glucose-DL-alanine interactions. **Journal of Agricultural and Food Chemistry** 36(4); 1988; 673-676

Chemistry(Analytical)

816 Furst (P), Kruger (C), Meemken (H-A) and Groebel (W). Determination of chloramphenicol residues in foods using GC/MS. **Deutsche Lebensmittel-Rundschau** 84(4); 1988; 108-113 (De).

A GC/MS/NCI-method to detect chloramphenicol residues in meat, eggs and milk in the sub-p.p.b. range is described. After addition of meat-chloroamphenicol as an internal standard the extraction and clean-up of the samples is performed according to the multi-residue procedure of **Malisch**, however, in a shortened version. Combined gas chromatography/mass spectrometry with negative chemical ionization (NCI) and selected ion monitoring (SIM) is used for the separation and detection of the silylated compounds. From the analysis of 35 blank samples a limit of detection of 0.025 p.p.b. and a limit of decision of 0.037 p.p.b. were calculated. When analysing meat and eggs fortified with 0.9 and 9 p.p.b. CAP we obtained recovery rates between 83 and 96% with a coeff. of variation between 2.9 and 7.1%. The results of 76 investigated samples are reported. AS

817 Halket (JM) and Schulten (H-R). Fast profiling of food by analytical pyrolysis. **Zeitschrift fur Lebensmittel-Untersuchung und -Forschung** 186(3); 1988; 201-212

The analytical application of direct pyrolysis (Py) field ionization (FI) mass spectrometry (MS) and Curie-point pyrolysis gas chromatography-mass spectrometry (Py-GC/FIMS) to various whole foodstuffs is described for the first time. The former technique yields highly differentiated information from the sample in typically 15 min, namely the mol. wt. distribution of released volatiles and pyrolysis products in a single spectrum which, owing to the good reproducibility and high significance of the resulting data, has previously been shown to be suitable for the application of chemometric methods . Such mass spectral peaks are further characterized and assigned by high resolution mass measurement and/or by electron ionization after Curie-point pyrolysis and gas chromatographic separation of the components. In this first report, typical results are presented for ground roasted coffee, rosehip tea, wheatmeal biscuit, chocolate drink powder and milk chocolate. The FI mass spectrum obtained from the latter sample is compared with those obtained using the complementary soft ionization techniques of chemical ionization (CI) and direct chemical ionization (DCI). AS

818 Klug (C), Baltes (W), Kronert (W) and Weber (R). Method for the determination of ergot alkaloids in food. **Zeitschrift fur Lebensmittel-Untersuchung und -Forschung** 186(2); 1988; 108-113

A suitable method has been developed for the routine analysis of the ergot alkaloids ergometrine, ergometrinine, ergosine, ergosinine, ergotamine, ergotaminine, ergocornine, ergocorninine, Alpha-ergocryptine, Alpha-ergocryptinine, Beta-ergocryptine, Beta-ergocryptinine, ergocristine and ergocristinine in cereal products. The method consists of food extraction, cleaning of the crude extract by a modified form of the Extrelut method, and identification and quantitative detn. of the alkaloids by high pressure liquid chromatography (HPLC). The results are confirmed by thin layer chromatography (TLC) and gas chromatography/mass spectrometry (GC/MS). Market investigations have shown contaminations in ecological as well as in conventional products, with rye products mainly being contaminated. Within the EEC, a max. value of 0.05% ergot resp. a total alkaloid content of 1 mg/kg in cereals used for food production is prescribed. This value was not exceeded in any of the investigated samples. AS

819 Schieberle (P) and Grosch (W). Identification of potent flavour compounds formed in an aqueous lemon oil/citric acid emulsion. **Journal of Agricultural and Food Chemistry** 36(4); 1988; 797-800

The flavour compounds of a fresh and stored (30 days at 37 C) emulsion of lemon oil in an aqueous citric acid solution were analyzed by high-resolution gas chromatography and eluate sniffing. Application of this technique on stepwise-diluted extracts of the volatile compounds allowed the detn. of a new parameter, the FD factor, which reveals the most intense flavour compounds of the extract. On the basis of their high FD factors, geranial, neral, and linalool were identified as the most intense volatile flavour compounds of the fresh lemon oil. Lower FD factors were found for myrcene, limonene gamma-terpinene, octanal, nonanal, citronellal, 2(E)-nonenal, and decanal. After storage, neral, geranial, and citronellal were no longer sensorially detectable. On the other hand, p-methylacetophenone, p-cresol, fenchyl alcohol, p-cymene, and 1-terpinen-4-ol were formed during storage and showed high FD factors. AS

FOOD MICROBIOLOGY AND HYGIENE

Enzymes

Amylases

820 Przybyt (M) and Sugier (H). The properties of glucoamylase soluble and immobilized on DEAE cellulose. Part II. Thermostability of glucoamylase. **Starch/Starke** 40(5); 1988; 171-174

the solubility of glucoamylase as a catalyst of starch hydrolysis reaction against heat denaturation was examined for enzyme adsorbed on DEAE-cellulose as well as in solution. The activation energy of the denaturation process of enzyme was higher in adsorbed state than in solution. Heat treatment of enzyme adsorbed below 50 C enchanced its catalytic activity in the presence of starch. Protective action of starch against thermal inactivation of enzyme was more pronounced when it was adsorbed on DEAE-cellulose. Thermostability of glucoamylase increased with increase in the amount of enzyme adsorbed. **SZA**

821 Sanni (AI). Enzyme studies during the production of agadagidi. Part 1. Amylase activities. **Nahrung** 32(2); 1988; 157-161

Amylase activities in fermenting agadagidi is reported. Highest amounts of reducing sugars produced by amylase activities in fermenting plantain chips, agadagidi samples and associated microorganisms were obtained at 30 and 35 C. The best pH range for enzyme activity was 5.1-7.2. AS

Invertases

822 Sanni (AI). Enzyme studies during the production of agadagidi Part. 2. Invertase activities. **Nahrung** 32(2); 1988; 163-168

Invertase activities were assayed during fermentation period. The plantain chips, agadagidi samples, and associated microbes demonstrated invertase activitis except the bacteria sp. External factors such as pH and temp. of incubation affected activity of the enzyme. AS

Microorganisms

Bacteria

823 Brown (KL), Gaze (JE), McClement (RH) and Withers (P). Construction of computer-controlled thermoresistometer for the determination of the heat resistance of bacterial spores over the temperature range 100 to 150 C. **International Journal of Food Science and Technology** 23(4); 1988; 361-371

A computer-controlled thermoresistometer for the determination of the heat resistance of bacterial spores has been designed and constructed and the details of which have been presented in this paper. This is found to be capable of operating between 100 and 150 C plus or minus 0.1 C with exposure times as short as 0.1 sec. Five samples (0.01 ml) of spore suspension can be exposed to steam at each time/temp. combination with the help of a computer controlled piston driven exposure system. The temp. control of the system is also achieved using platinum resistance probes linked to the computer thereby actuating a variable steam control value. NGKR

824 Banks (JG), Morgan (S) and Stringer (MF). Inhibition of heated **Bacillus** spores by combinations of potassium sorbate, sodium, benzoate, pH and organic acids. **Lebensmittel-Wissenschaft und-Technologie** 21(5); 1988; 250-255

The influence of benzoate and sorbate in combination with citrate, lactate and acetate over the pH range 4.2-6.0 on heated (65 C, 60 min) spore suspensions of five **Bacillus** sp. was studied. Heating had no effect on the viability or growth rate in mineral acid-treated systems and synergistic growth inhibition was only noted for mixtures of acids and preservatives close to the minimum pH for growth. AS

Clostridium botulinum

825 Gaze (JE) and Brown (KL). The heat resistance of spores of **Clostridium botulinum** 213B over the temperature range 120 to 140 C. **International Journal of Food Science and Technology** 23(4); 1988; 373-378

Clostridium thermecellum

826 Mori (Y) and Sekozawa (A). Improvement of **Clostridium thermocellum** for increased thermotolerance. **Report of the National Food Research Institute '(Shokuryo Kenkyusho Kenkyu Hokoku')** 63(3); 1988; 15-17 (Ja).

In order to perform direct conversion of cellulose to ethanol at higher temp., the thermotolerant mutant designated as YM4T was derived from **Clostridium thermocellum** YM4 by ultraviolet and Gamma-ray mutagenesis. Strain YM4T can grow at temp. up to 66 C at almost the same rate as does the parental strain at its optimum temp. of 58-62 C. A co-culture of strain YM4T and **C. thermohydrosulfuricum** YM3 converted 19.5 g/l of Avicel to 7.8 g/l of ethanol, 2.4 g/l of lactate, and 1.1.g/l of acetate within 72 h at 66 C. Strain YM4T is considered to have an advantage over the parental strain in a flash-ferm process. **AS**

Listeria monocytogenes

827 Smith (JL) and Hunter (SE). Heat injury in **Listeria monocytogenes.** Prevention by solutes. **Lebensmittel-Wissenschaft und-Technologie** 21(5); 1988; 307-311

Cells of **Listeria monocytogenes** (Scott A strain) were heat-injured when held in phosphate buffer (0.1 M, pH 7.2) at 52 C for 1h. Addition of salts (NaCl or KCl at 3 M), sugars (xylose, a-methylglucoside, mannose, glucose, galactose, lactose, or sucrose at 1 M), or polypols (glycerol or mannitol at 1 M) markedly decreased. the injury, i.e. the presence of solutes in the heating buffer protected **L. monocytogenes** against heat injury. However, addition of ammonium chloride or fructose to the buffer did not lead to protection but rather increased cell death at 52 C. Utilization of carbonhydrates for growth by **L. monocytogenes** was unrelated to their ability to protect the cells against heat injury. The survival of **L. monocytogenes** during heating when solutes were present has definite implication in terms of food safety. **AS**

Pseudomonas fluorescens

828 Ren (TJ), Frank (JF) and Christen (GL). Characterization of lipase of **Pseudomonas fluorescens** 27 based on fatty acid profiles. Journal of **Dairy Science** 71(6); 1988; 1432-1438

The objectives of this research were to isolate lipase from **Pseudomonas fluorescens** 27, to compare the purity of the partially purified lipase preparation with crude extract, and to determine if bands of lipase activity revealed by disc gel electrophoresis liberated different free fatty acids from milk fat. Lipases were isolated from a shaken skim milk culture of **P. fluorescens** 27 by using ion-exchange chromatography on DEAE cellulose (Whatman DE 32) and gel filtration of Sephadex G-I50. The principal lipase-rich fractions from gel filtration represented 6.2% of total lipolytic activity. Disc gel electrophoresis of partially purified enzyme revealed two protein bands. These protein bands were cut from disc electrophoresis gels and used as an enzyme source for reaction with butter oil. Free fatty acids were isolated from the assay mixture, separated, and quantified by gas chromatography. Data from gas chromatographic analysis indicated that **P. fluorescens** 27 produces at least two different lipases. AS

Salmonella

829 Jay (LS) and Comar (D). Comparative study of TECRA **Salmonella** visual immunoassay and Australian standard cultural mehtods for analysis of salmonellae in foods. **Food Technology in Australia** 40(5); 1988; 186-191

This paper reports the performance of TECRA **Salmonella** visual immunoassay as compared with standard culture methods for detection of **Salmonella** in 572 food samples (446 processed and 126 unprocessed). It has been seen that 60 **Salmonella** positive samples comprising 42 naturally contaminated and 18 inoculated samples were detected by enzyme immunoassay (EIA) and also confirmed by culture. Cultural methods detected 59 positive samples and one sample was not detected by cultural methods due to overgrowth of competitve organisms on selective agar plates. It is also seen that EIA provides clearance of foods for **Salmonella** atleast 48 h ahead of traditional culture techniques. These results indicated that the TECRA TM EIA method will reduce the amount of confirmation work performed on samples which do not contain **Salmonella**. NGKR

830 Zavanella (M) and Khalif Mohamed (U). Comparison of an ELISA screening kit and conventional culture procedure for detection of **Salmonella**. **Industrie Alimentari** 27(258); 1988; 253-254 (It).

An enzyme-linked immunosorbent assay (ELISA) for detection of **Salmonella** was evaluated using 148 specimen of foods, feeds, rinsing swabs, feces, embryonated eggs. The ELISA correctly indentified 4 samples positive to the culture method and increased the number of isolation in 5 cases. The ELISA may be most useful as a rapid screening test to discard negative specimens 24 h after receipt. AS

BIOTECHNOLOGY

831 Lyons (TP). Proteinases in industry. **CRC Critical Reviews in Biotechnology** 8(2); 1988; 99-110

In this article, the application of proteinases in the baking and animal feed industry are outlined. Certain specifications for enzymes to work in both cases are made. BV

832 Paredes-Lopez (O) and Harry (GI). Food biotechnology review. Traditional solid-state fermentations of plant raw materials-Applications, nutritional significance, and future prospects. **Tutkimuksia, Valtion Teknillinen Tutkimuskeskus** 27(3); 1988; 159-187

This review on the use of indigenous solid-state informations (SSF) describes the microbiological transformation of plant raw materials into highly nutritious foods and flavour-enhancing ingredients. Traditional fermented foods from most countries of the world may be classified into the follwoing categories; fungal fermentation followed by brining, SSF principally using bacteria, lactic acid fermentation followed by fungal fermentation, production of fermented doughs, alcoholic fermentation, and fermented food ingredients. Scientific studies of the principles behind SSF identification of the essential microoorganisms, development of suitable and versatile equipment, control of the process, and quality control of the substrate and final product can very well lead to a substantial increase at a world level in the availability and consumption of these fermented foods. The application of modren biotechnology in some countries is already changing the ancient mehtods of making fermented foods. AS

TISSUE CULTURE

833 Tapie (P) and Bernard (A). Microalgae production. Technical and economic evaluation. **Biotechnology and Bioengineering** 32(7); 1988; 873-885

A review of the various literature data for large-scale algae production, costs is described. Costs were updated and recomputed in order to compare the different schemes. Total production costs of a nonprocessed biomass range from US\$0.15 to US\$4.0 kg^{-1}, according to various authors. Process performance hypotheses and proposed technologies are analyzed to explain these variations. A cost analysis for a tubular bioreactor system is then presented that shows that, assuming a productivity of 60 tons/ha/ yr, production costs would range from FF24 to FF29 kg^{-1} for such a system. Operating costs as well as fixed charges account for approx. 50% of the cost. Parametric sensitivity of these costs is then analyzed; if productivity would be 30, 45, or 90 tons/ha/yr, total cost would be around FF48, FF33 and FF19 kg^{-1}. Advantages and disadvantages of the proposed tubular technology are finally discussed. AS

FOOD ADDITIVES

Colourants

Dyes

Brilliant Black

834 Maslowska (J) and Janiak (J). Polarographic studies on brilliant black BN. **Deutsche Lebensmittel-Rundschau** 84(5); 1988; 151-153 (De).

The mechanism of polarographic reduction of the basic food dye-Brilliant Black BN within pH-2-12 has been investigated. Rapid and reproducible procedure for quantative detn. of this dye by the dpp method is proposed. A linear dependence of polarographic wave hight (h) on concn. has been obtained for the concn. range from 1.10^{-4} to 1.10^{-7} mole/l. AS

Flavour

835 Guillen Sans (R) and Guzman Chozas (M). Reactivity of 2-thiobarbituric acid (TBA) with carbonyl compounds. Its importance in oxidative rancidity and the flavour profile of foodstuffs. **Grasas Y. Aceites** 39(3); 1988; 185-189 (Es).

In this review the reactivity of 2-thiobarbituric acid with aldehydes, ketones and other derivatives which present the carbonyl group is described. The characteristics of the reactions are mainly discussed on the basis of the profile that the absorption spectra show. The properties and characteristics of the coloured compounds formed (alkylidenethiobarbituric acids, arylidenethiobarbituric acids) are evaluated in a comparative study. The importance of these reactions in the pursuit of the oxidative rancidity, in the evaluation of substances (aldehydes, ketones) present in the essential oils (spices and aromatic plants) and flavour of fruits, in the detn. of pyridine and pyrimidine compounds, carboxylic acid, sugars and vitamins is emphasized. AS

Preservatives

836 Krull (L) and Matissek (R). DC detection of acid preservatives in food and cosmetics after **in-situ** derivatization. **Deutsche Lebensmittel-Rundschau** 84(5); 1988; 144-146 (De).

The present paper is description of a new, efficient and easily appliable TLC-method for a sure identification of preservatives with a carboxyl group (acid preservatives) in foodstuffs and cosmetic products. The principle is based on an in-situ derivation of acid preservatives with alpha-bromo-2-acetonaphthone resulting in self-flourescent derivatives and their subsequent thin-layer chromatographic separation. The method is in particular marked by a reliable separation, e.g. a clearly defined differentiation of the preservatives sorbic acid and benzoic acid, which are often jointly used and considered as a critical pair. AS

Sweeteners

837 Gelardi (RC). Low-calorie foods and sweetener choices. **Activities Report** 40(2); 1988; 91-97

Aspartame

838 Janssen (PJCM) and van der Heijden (CA). Aspartame. Review of recent experimental and observational data. **Toxicology** 50(1); 1988; 1-26

The neurotoxicity of aspartame and its constituents amino acids aspartic and phenylalanine has been reviewed. MVG

CEREALS

839 Dicke (W), Ocker (HD) and Thier (HP). Residual analysis of pyrethroid insecticides in cereal grains, milled fractions and bread. **Zeitschrift fur Lebensmittel-Untersuchung und -Forschung** 186(2); 1988; 125-129

A procedure is described for the residual analysis of eight pyrethroid insecticides at levels of 2-5 µ g/kg. Residues are extracted from cereal grains, flour or bread with a mixture of acetonitrile/water (2 + 1) and are partitioned into petroleum ether. Clean-up is performed by gel permeation chromatography on Bio-Beads S-X3 and an additional Florisil column. Electron caputre gas liquid chromatography on a non-polar SE-30 capillary column separates the isomers of the compounds. Under the conditions used in the experiments with cyfluthrin, cypermethrin, deltamethrin, fenevalerate, and permethrin, the compound levels in rye and wheat did not decrease significantly. Losses during milling and baking were small. Consequently, pyrethroid insecticides remain effective in grain stored over a long period of time. However, considerable residues result in the milled fractions as well as in different types of bread. AS

840 Gohil (S), Pattersson (D), Salomonsson (AC) and Aman (P). Analysis of alkyl and alkenylresorcinols in triticale, wheat and rye. **Journal of the Science of Food and Agriculture** 45(1); 1988; 43-52

Alkyl- and alkenylresorcinols were extracted with acetone from whole kernels of wheat, rye and various triticales. The resorcinols were ethylated, analysed by GC on a capillary column and further identified by GC-MS. Alkylresorcinols with chain lengths of C_{15}, C_{17}, C , C_{21}, C_{23}, and C_{25} and pairs of isomeric C_{17}, C_{19}, C_{21}, C_{23} and C alkenylresorcinols were quantified in all samples. The content of alk(en)ylresorcinols was highest in rye, intermediate in triticale and lowest in wheat. The relative composition of the resorcinols differed between grains, with a higher content of the C_{19} alkylresorcinol in rye and of the C_{21} alkylresorcinol in wheat. Wheat and three lines of triticale were harvested at three stages of maturity after the grain filling period was ended (water content 40, 30 and 20%). During this period of time the gross chemical composition, water extract viscosity, and content and relative composition of the alk(en)ylresorcinols, were relatively constant. AS

Barley

841 Bhatty (RS) and Macgregor (AW). Gamma irradiation of hulless barley. Effect on grain composition, Beta-glucans and starch. **Cereal Chemistry** 65(6); 1988; 463-470

Seout hulless barley was gamma irradiated to 10 Mrad (100 kGy) with cobalt-60. Irradiation had no major, apparent effect on grain composition, except for starch and beta-glucans. Total N, nonprotein N, and amino acid composition of nonirradiated and irradiated barleys were identical. The sodium dodecyl sulphate-polyacrylamide gel electrophoresis patterns of the two barleys were also identical. However, protein bands corresponding to 45 and 94 k Da showed reduced staining. Irradiated barley completely loss had reduced endosperm cell wall fluorescence but higher (75%) soluble-Beta-glucans. Irradiated barley starch contained lower mol. wt.l amylose and amylopectin comapred to the nonirradiated barley starch. However, the two starches showed similar endothermic properties (differential scanning calorimetry) and gelatinization temp. The starch granules appeared to be normal externally but were fractured internally. This was particularly evident during the later stage of gelatinization. Irradiation increased the susceptibility of barley starch to Alpha-and Beta-amylase hydrolysis. Irradiated barley had lower **in vivo** dry matter (2.6%) starch (1.0%) and protein (5.2%) digestibilities as determined by mouse-feeding experiments. AS

Rice

842 Hendrickx (M), Lauwerens (C) and Tobback (P). Moisture diffusivities for bran and endosperm during soaking of long-grain brown rice. **International Journal of Food Science and Technology** 23(4); 1988; 385-390

843 Ramarathnam (N), Osawa (T), Namiki (M) and Kawakishi (S). Studies on changes in fatty acid composition ana content of endogenous antioxidants during gamma-irradiation of rice seeds. **Journal of the American Oil Chemists" Society** 66(1); 1989; 105-108

Accelerated aging effects, induced by gamma-irradiation on two var. of rice seeds namely **Indica** and **Japonica**, were investigated. The overall susceptibility to oxidative damage was less in **Indica** rice seeds indicating that the loss of alpha-tocopherol and oryzanol contents was prevented by the better protection offered by the hull portion in **Indica** var. MNK

844 Ramarathnam (N), Osawa (T), Namiki (M) and Kawakishi (S). Chemical studies on novel rice hull antioxidants. 1. Isolation, fractionation, and partial characterization. **Journal of Agricultural and Food Chemistry** 36(4); 1988; 732-737

The chemical aspects of the novel antioxidative defense system in rice hull was studied. Despite the presence of alpha-tocopherol and oryzanol in long-life and short-life rice seeds, the antioxidative constituents were relatively stronger in their activity, and hence might play a vital role in prevention of aging of rice seeds. The long-life and short-life rice seeds. The long-life and short-life rice seeds were shown to differ in the qualitative and quantitative composition of the active fractions of their hull extracts. However, in both active hull extracts, phenolic constituents appeared to be more responsible for the antioxidative activity. MVG

Rice bran

845 Sloan (S) and James (C). Extruded full-fat rice bran in muffins. **Lebensmittel-Wissenschaft und-Technologie** 21(5); 1988; 245-247

Extruded full-fat rice bran at 5, 10, 15 and 20% levels and wheat bran at the 15% level were incorporated into muffins, which were evaluated by specific vol. and sensory methods. Vol. of the muffins were not adversely affected by the incorporation of the brans. Panelists detected a significant difference in taste between the rice bran muffins, as evaluated by the triangle difference test; however, there was no significant difference in preference. Muffin appearance, flavour and texture characteristics were influenced by the incorporation of the brans, as evaluated by Quantitative Descriptive Analysis, but all muffins were acceptable. AS

Wheat

846 Eckhoff (SR), Supak (WA) and Davis (AB). A rapid single-kernel wheat hardness tester. **Cereal Chemistry** 65(6); 1988; 503-508

The design of an instrument to differentiate hard from soft wheat on an individual kernel basis and its initial evaluation are presented. The unit is an automated system capable of sampling rates up to 200 kernels per minute. Hardness evaluation achieved by shearing individual kernels and recording the associated force breakage curves. The tester was found to have an 80% classification accuracy for the five hard and five soft var. tested. Initial testing showed that a discriminant model combining pea force, peak sharpness, and a fourier transformation of data collected produced a useful classification system. However, peak force as a single criterion was almost as effective. A sharp cutting edge supplied the greatest differentiation between brittle and ductile materals when compared with square-edged and radius blades. Peak force readings collected were affected by variations in kernel moisture content, size, and orientation during cutting. AS

847 Jaddou (H). Studies of some physical and chemical characteristics of Ajeeba wheat cultivar and some of its mutants. **Acta Alimentaria** 17(2); 1988; 169-175

The rheological and baking quality of Ajeeba wheat cvs and seven of its mutants were examined. All mutants were significantly lower in ash and protein content than that of the control. Elemental content were higher in K, Ca, Mg, Fe, Mn, Na, Zn and Cu for most tested mutants. Farinograph data showed a long stability time for B13, B117 and B7 mutants indicating that their flours could be used successfully for breadmaking. These mutants gave higher values for mixing tolerance, falling number and amylograph peak except the falling number value for B7. The mutants B13, B117, and B7 also showed significantly higher loaf volume than the control with lighter colour. **AS**

848 Scanlon (MG), Dexter (JE) and Biliaderis (CG). Particle-size related physical properties of flour produced by smooth roll reduction of hard red spring wheat farina. **Cereal Chemistry** 65(6); 1988; 486-492

Hard red spring wheat farina further reduced to different particle sizes by altering the roll gaps and differentials of lab. mill showed that the structural alterating are much greater in particle size less than 53 µ m compared with coarser fractions. Greater compressive forces did not alter the degree of starch damage with fine flour fraction, possibly due to greater stress attending more fracturing than altering the mode of particle release from the parent farina. Increased differential increased the starch damage as a result of shearing forces acting at the starch/protein interface causing crystallite slippage within the starch granule. The ratio of starch damage by amylose extractability method to Alpha-amylase digestibility method increased with increased differential. This increase in extractability/digestibility ratio is ascribed to greater crystellite slippage which disrupts the amorphous regions containing the amylose. Where as the movements of crystallites is inhibited at 1:1 differential due to reduced shearing forces, but favours the brittle fracture through the more proteinaceous regions leading to higher protein and ash contents and darker colour of the flour. **AR**

Wheat bran

849 Feng (Y), McDonald (CE) and Vick (BA). C-glycosyl flavones from hard red spring wheat bran. **Cereal Chemistry** 65(6); 1988; 452-456

Two flavonoids 6-C-pentosyl-8-C-hexosyl and 6-C-hexosyl-8-C-pentosylapigenin were isolated and identified in HRS wheat bran by mass spectrometry 13^{C} NMR and UV spectroscopy. **AR**

Wheat flour

850 Laignelet (B). Effect of defatting on solubility of wheat flour proteins in solutions of sodium stearate. **Lebensmittel-Wissenschaft und-Technologie** 21(5); 1988; 248-249

Wheat starch

851 Finney (PL), Kinney (JE) and Donelson (JR). Prediction of damaged starch in straight grade flour by near infrared reflectance analysis of whole ground wheat. **Cereal Chemistry** 65(6); 1988; 449-452

The amount of damaged starch generated by grinding 25 g of whole wheat samples in a Udy cyclone mill was measured by enzymatic and near-infrared reflectance (NIR) methods. High correlation were achieved between the method. In addition, it was possible to predict the amount of damaged starch induced by controlled Allis-Chalmers and Quadrumat Junior milling by the NIR analysis of the Udy-ground samples. Hard and soft classes of wheat could usually be separated by NIR analysis of damaged starch. AS

MILLETS

852 Obizoba (IC). Nutritive value of malted, dry- or wet-milled sorghum and corn. **Cereal Chemistry** 65(6); 1988; 447-449

A 12-day study consisting of five day adjustment and seven day nitrogen-balance periods was conducted to evaluate the protein quality of malted sorghum and corn, dry or wet milled and supplemented with crayfish to provide 1.6 g of nitrogen per 100 g of the daily diet of adult rats. Wet milling produced high-quality protein that blended well with crayfish to effect increases in most of the parameters tested. The processes of malting and wet milling seem to offer methods for improving the nutritional value of the proteins of sorghum and corn by increasing the total protein content and quality. AS

Corn

853 Chien (JT), Hoff (JE) and Chen (LF). Simultaneous dehydration of 95% ethanol and extraction of crude oil from dried ground corn. **Cereal Chemistry** 65(6); 1988; 484-486

A column reactor operating at 68 plus or minus 2 C was used to demonstrate the feasibility of a new process that simultaneously dehydrates ethanol and extracts crude oil from dried ground corn. For each kilogram of dried ground corn, the moisture adsorption capacity was approx. 32 g using 95% (w/w) ethanol as solvent. As a result it was possible to dehydrate 500ml of 95% ethanol and simultaneously extract 45 g of the crude oil from each kilogram of dried ground corn. The crude oil contained 2.1% of phospholipids on a dry wt. basis. AS

854 Hedin (PA), Paul Williams (W), Davis (FM) and Thompson (AC). Effects of plant bioregulators on nutrients, insect resistance, and yield of corn (**Zea mays** L.). **Journal of Agricultural and Food Chemistry** 36(4); 1988; 746-748

855 Karlovic (DJ), Jakovljevic (J) and Turkulov (J). Some technological aspects of corn germ processing in Yugoslavia. **FAT Science and Technology** 90(8): 1988; 322-325 (De).

The quality of wet milled (WMCG) and dry milled (DMCG)-corn germs from Yugoslav starch- and dry milling corn plants have been investigated. Results of investigations showed that DMCG , separated by Bealdegerminator, contained 13.7-21.4% of oil and moisture in wide range (7.8-13.1%). Consequently, they are characterised by high levels of FFA (1.75 -4.83%). Cold extracted oil from this germ did not contain oxidized products. On the other hand WMCG contained higher levels of oil (40.3-50.3%), but the quality of cold extracted oil was inferior. High levels of total oxidized products are especially unfavourable, making subsequent stage of oil refining troublesome, as is pointed in this paper. AS

Corn flour

856 Foehse (KB) and Hoseney (RC). Factors affecting the Bostwick fluidity of corn flour/water systems. **Cereal Chemistry** 65(6); 1988; 497-500

Factors that affect the fluidity of corn flour water dispersions were studied using vol. fraction versus fluidity curves and packing fractions. Different corn flour had different volume fractions versus Bostwick fluidity curves and different packing fractions. The position of those curves and packing fractions along the volume fraction axis reflected the fluidity of the various corn flour water dispersion. The major factors affecting that position were particle size, partcle size distribution and the amount of damaged starch in the flour. AS

857 Foehse (KB), Hoseney (RC) and Johnson (DE). Predicting the fluidity of corn flour/water systems. **Cereal Chemistry** 65(6); 1988; 501-502

Volume fractions versus fluidity curves and packing fractions can be used to characterize differences in the fluidities of slurries made with various corn flours and water. The data used to generated such fluidity curves and packing fractions also were used to develop a fluidity prediction plot. This plot allowed us to predict the amount of water per gram of dry corn flour required to produce a dispersion with a desired fluidity. A corn flour blending equation was also developed, specifying the proportions of two or more corn flours to be blended into a flour having a desired packing fraction. The corn flour blending equation and the fluidity prediction plot can be used together to a[illegible] corn millers to create blended corn flours that have predictable fluiditiy when mixed with water. AS

Sorghum

858 Bach Knudsen (KE), Munck (L) and Eggum (BO). Effect of cooking, pH and polyphenol level on carbohydrate composition and nutritional quality of sorghum (**Sorghum bicolor** (L.) Moench) food, ugali. **British Journal of Nutrition** 59(1); 1988; 31-47

The present work was undertaken to study the effects of cooking, pH and polyphenol level on carbohydrate composition and nutritional quality of sorghum (**Sorghum bicolor** (L.) Moench). Three different sorghum var.; Dabar, Feterita and Argentine containing zero, intermediate to low and high levels of polyphenols resp. were used in the study. From these var. uncooked, uncooked acidified, cooked, and cooked acidified diets were prepared. Diets were characterized with regard to resistant starch (RS), dietary fibre (DF) acid detergent fibre (ADF) and amino acid content. Raw materials were further analysed for content and composition of non-starch polysaccharides and Klason lignin. The nutritional properties were studied in balance trails with rats. True protein digestibility (TD), biological value (BV), net protein utilization, digestible amino acids, digestible energy (DE) and digestible DF were used as criteria in the nutririoanl study. Cooling at neutral and acid p H resulted in significantly higher assayed values for DF. Increase in DF could be accounted for by formation of RS. Approx. 50% of RS was recovered in the faeces. In vitro values of protein associated with ADF and in vivo balance values using rats suggests thatn an endosperm protein fraction, kafirins, was made unavailable during cooking. This resulted in reduced TD and increased BV. It is assumed that unavailable kafirins serves as a nitrogen source for microflora in the hind-gut. Dietary polyphenols changed the excretory route for N from urine to faeces. This resulted in lower TD and higher BV in Argentine (high in polyphenols) than in Dabar and Feterita (low in polyphenosl) although dietary lysine (first limiting amino acid) was the same in the three var. Variation in DE of the diets was attributed to DF, RS and the amount of faecal protein, which in turn were influenced by undigested kafirins and polyphenols. AS

859 Chandrashekar (A) and Kirleis (AW). Influence of protein as starch gelatinization in sorghum. **Cereal Chemistry** 65(6); 1988; 457-462

Sweet corn

860 Brockett (E), Thompson (D), Davis (T) and Boyer C). Gelatinization characteristics of starch from **du**, **wx**, **ae** and **ae wx** endosperm of sweet corn inbred Ia5125 **Starch/Starke** 40(5); 1988; 175-177

Starch gelatinization in excess water was studied by differential scanning calorimetry for the mutants **dull**(du), **Waxy** (**Wx**), and **amylose extender** (ae), and the double mutant **amylose-extender, waxy (ae wx)** from the sweet corn inbred Ia 5125. For du and **wx** starches, peak temp. (T_{max}) was within 1 C of the value for the normal starch (69.4 C). Starches from other mutants showed 7-8 C higher T_{max} than the normal starch. The highest enthalpies of gelatinization were observed and for **wx** (3.26 cal/g) and **ae wx** (3.39 cal/g) starches; **ae** (2.93 cal/g) and normal (2.52 cal/g) starches were intermediate, and **du** (2.32 cal/g) starch had the lowest enthalpy. The endotherm of the **ae** starch, was completed at just above 100 C, in distinction to reports for **ae** mutants from dent lines. The **ae wx** endotherm was sharp relative to **ae** endotherm and was complete at 90 C. AS

PULSES

861 Quemener (B). Improvements in the high-pressure liquid chromatographic determination of amino sugars and Alpha-galactosides in faba bean, lupine, and pea. **Journal of Agricultural and Food Chemistry** 36(4); 1988; 754-759

Beans

862 Parades-Lopez (O), Maza-Calvino (EC) and Montes-Rivera (R). Effect of the hard-to-cook phenomenon on some physico-chemical properties of bean starch. **Starch/Starke** 40(6); 1988; 205-210

Two important bean (**Phaseolus vulgaris**) var. viz. Negro Oro and Canario were stored after harvest under cold (4 C, 'fresh') and hot and humid (40 C 80% relative humidity) atm. for 135 days. Hard-to-cook (HTC) phenomenon developed in the latter seeds as assessed by the **Mattson** cooker and Instron texturemeter. Analysis of physicochemical parameters showed that the damaged starch content, water absorption and swelling were higher for starches isolated from HTC seeds than from fresh. HTC seed starch also had a higher peak viscosity in Brabender viscogram and lower stability and retrogradation capacities. Scanning electron microscopy of starch from HTC samples revealed the presence of some swollen granules and many with fissures, while those from control i.e. fresh seeds had smooth surfaces. DSC evaluation showed that gelatinization temp. and transition enthalpies were not significantly influenced by storage. Birefringence studies supported these results. The changes in starch were not-sufficient to modify the gelatinization performance. SZA

Broad beans

863 Hartmann (B) and Schmandke (H). Gelation of a broad bean (**Vicia faba** L. minor) protein fraction (prepared at pH 2) in dependence on some influencing factors. **Nahrung** 32(2); 1988; 127-133

A protein fraction is prepared from broad bean protein isolate at pH 2 which forms gels in the acid pH range. The gels are fluid at high temp. and become strength when cooling. The gel strength increases with increasing pH, with increasing heat treatment, and with increasing protein concn. Addition of calcium and dextrose sirup increases the gel strength whereas sucrose decreases it. The transparency of the gels decreases with increasing pH. AS

Carob beans

864 Vasquez (M), Carbonell (E) and Costell (E). Rheological behaviour of carob (**Prosopis chilensis**) bean gum solutions. Comparison with guar and locust bean gum solutions. **Revista de Agroquimica y Tecnologia de Alimentos** 28(2); 1988; 251-260 (Es).

Flow of carob bean gum solutions, obtained from the **Prosopis chilensis** sp. (CBG), was characterized at seven concn. (0.16-1.03 % w/w) and compared with those of solutions of guar gum (GG) and locust bean gum, from **Ceratonia siliqua** sp. (LBG). Flow of CBG and GG was non-Newtonian at concn. over 0.25% and that of LBG over 0.40%; in the three cases, flow fitted well to the Ostwald model ($\text{Tau} = KD^{n}$) (r greater than or equal to 0.995). At. 0.2% concn., the viscosities of the three gums solutions were similar ($\text{CBG} = 10.5^{-1}$), apparent viscosities of CBG and LBG were similar (1,633 and 1,563 mPas, resp.) while that of GG was higher (2,147 mPash) ; when $D = 100\ S^{-1}$ LBG showed the highest viscosity, followed by GG & CBG (410, 376, & 352 mPa. S, resp.). When comparing the evolution of the flow index (n) and of the consistency index (K) with gum concn. the flow characteristics of CBG are shown to fall between those of the other gums. **AS**

Faba beans

865 Mendoza Martinez (AM), Muschiolik (G) and Sherman (P). Influence of acetylated faba bean protein isolate on the rheological behaviour of O/W emulsions: **Nahrung** 32(2); 1988; 205-207

Acetylated faba bean protein isolate (**AFBPI**) is particularly suitable for the stabilisation of O/W emulsions in acid and neutral pH regions. An essential feature of the consistency of O/W emulsions stabilised with AFBPI is an attractive cereamy texture and non-slimy mouthfeel. The aim of the present paper was to investigate the influence of AFBPI with different degrees of acetylation on the rheological behaviour of neutral and acidified, freshly prepared, concentrated oil-in-water emulsions. **AS**

Field beans

866 Notzold (H), Ludwig (E), Schonfelder (C) and Zeibig (R). Plastein gels from partial hydrolyzate of field-bean protein isoalte. part 1. Viscosimetric investigations about gel formation in the course of the plastein reaction with partial hydrolyzates of field-bean protein isolate. **Nahrung** 32(2); 1988; 145-149 (De).

The changes in viscosity during plastein reaction of peptic partial hydrolyzates (PH) of a field-bean protein isolate using thermitase as plastein forming enzyme (PBE) were investigated by means of a falling-ball method. Formation of gel occurring in the course of the plastein reaction is influenced by temp. enzyme-sub-strate proportion, pH concn., TCE solubility of the pH peptides and the time PBE added to the substrate. High mol. peptides of pH are preferably split up hydrolytically by PBE and retard the gel formation. **AS**

867 Winkler (H), Notzold (H) and Ludwig (E). Formation of plastein, enrichment of hydrophobic amino acids and incorporation of methionine into peptic partial hydrolyzates of the field-bean protein isolate in case of the thermitase-catalyzed plastein reaction. **Nahrung** 32(2); 1988; 135-143 (De).

The thermitase-catalyzed plastein reaction of peptic partial hydrolyzates (PH) of the field-bean protein isolate taking or not taking into consideration the incorporation of methionine leads to an enrichment of hydrophobic amino acids in the reaction products insoluble in 10% trichloroacetic acid. The processes proceeding during plastein reaction are decisively influenced by pH-value, degree of degradation of the peptic pH and concn. of the substrate. The pH-optimum of the plastein formation for the plastein formation enzyme thermitase is a little less than that of proteolysis. The formation of plastein is favoured by the extensive degradation of the initial pH and the increasing concn. of the substrate i.e. by the high concn. of terminal amino groups as nucleophilic participants in a reaction and by the decreasing water activity. The quantity of the components precipitable in 10% TCA after the plastein reaction which is also designated as plastein yield is not very suitable as a measure of the plastein reaction. AS

Lima beans

868 Ologhobo (AD) and Fetuga (BL). Effects of different processes on the carbohydrates of lima bean. **Nahrung** 32(2); 1988; 173-177

Changes which occurred in the concn. of free sugars, high-mol. wt. carbohydrates (water-soluble carbohydrates, starch, hemicellulose, cellulose), and lignin in 3 differently processed var. of lima bean have been studied. Samples were boiled, autoclaved or soaked in water and germinated for 3 days. Available carbohydrates (starch + sugars) which initially ranged from 53.3 to 54.8 g/100 g dry matter in the raw var., decreased very drastically with germination whilst raffinose disappeared and stachyose + verbascose were reduced to trace levels. Cooking as well as autoclaving brought about slight decrease in glucose, fructose and sucrose levels and increased oligosaccharide content of all the var. Changes in the content of the structural carbohydrates of all processed var. were small. cooking and germination however affected some reductions in total unavailable carbohydrate content. The effect of these processes on improving the nutritional value of lima beans was discussed. AS

Lupins

869 Trugo (LC), Almeida (DCF) and Gross (R). Oligosaccharide contents in the seeds of cultivated lupins. **Journal of the Science of Food and Agriculture** 45(1); 1988; 21-24

The contents of sucrose and alpha-galactosides of the seeds of 84 cultivated lupin samples were determined by high performance liquid chromatography and the data were correlated both with genotype and environment. UJSPR

Lupin flour

870 Adel Shehata (A), Mergheni Mohamed (A), Mohamed Youssef (M) and El-Bastawisy Aman (M). Factors affecting protein dispersibility from full and defatted Egyptian lupin flours (**Lupinus termis**). **Journal of Agricultural and Food Chemistry** 36(4); 1988; 703-706

Factors influencing dispersibility of lupin proteins (particle size, flour to solvent ratio, pH, temp. time) were investigated. Moreover, the effects of four salts (NaCl) in wide concn. ranges were also studied. In the range pH 3-6, protein dispersibility from the defatted lupin flour (DLF) was higher than that from the full-fat lupin flour (FLF), contrary to pH values ranging between 8 and 10. Max. protein dispersibilities for DLF (89.82%) and FLF (97.92%) were achieved at pH 11, particle size 120 mesh, solvent to flour ratio 50:1 at room temp. for 30 min. Regarding salt dispersion, the presence of fat has appreciably affected protein dispersibility, depending on salt type, pH effect, and salt concn. AS

OILSEEDS AND NUTS

871 Galli (A), Di Fratta (A) and Locatelli (DP). A research on microbiology and hygiene of dried fruit (pineseeds, almonds, nuts and peanuts). **Industrie Alimentari** 27(257); 1988; 109-113 (It).

A research has been executed with the aim of checking the presence of microorganisms and extraneous material in dried fruit samples bought in different north Italian retail shops. All samples have been submitted to several microbiological analysis from which it is possible to lay stress on a heavy microorganisms contamination, above all for the samples of pineseeds. Some arthropods and fragments of the same have also been found on these samples. AS

Almond

872 Soler (L), Canellas (J) and Saura-Calixto (F). Oil content and fatty acid composition of developing almond seeds. **Journal of Agricultural and Food Chemistry** 36(4); 1988; 695-697

Oil content and fatty acid composition were determined in developing almond kernels (**Prunus amygdalus**) at 3-wks intervals, from March to September. Three marked stages with different rates of oil accumulation were observed. The major part of oil was stored in a 5-7 wks period, approx. 2 months before harvest. Significant variations of fatty acid composition were detected in the three stages cited. High percentages of palmitic, linoleic, and linolenic acids were present at initial stages, followed by a diminution of these acids and a continuous increase of oleic acid. AS

Groundnuts

873 Johnsen (PB), Civille (GV), Vercellotti (J), Sanders (TH) and Dus (CA). Development of a lexicon for the description of peanut flavour. **Journal of Sensory Studies** 3(1); 1988; 9-17

In this paper a lexicon of terms has been developed to describe desirable as well as undesirable flavours in peanuts. This lexicon and an intensity rating scale was developed by a 13 member panel of flavour and peanut specialists representing USDA ARS and industry. This will be very useful in studying peanut flavour variablies among all phases of peanut research and industry. NGKR

874 Subba Rao (PV), Geiger (JP), Einhorn (J), Malosse (C), Rio (B), Nicole (M), Savary (S) and Ravise (A). Isolation of methyl linolenate, a new antifungal compound from **Arachis hypogaea** L. leaves infected with **Puccinia arachidis** speg. **Oleagineux** 43(4); 1988; 173-177

Discusses the role of methyl linolenate as a new antifungal compound from **Arachis hypogaea** L. leaves naturally infected with **Puccinia arachidis** speg. Purification characterization and antifungal activity of this compound are described and its role in host defense mechanisms against rust infection is covered. BV

Groundnut proteins

875 Basha (SM). Resolution of peanut seed proteins by high-performance liquid chromatography. **Journal of Agricultural and Food Chemistry** 36(4); 1988; 778-781

Peanut **Arachis hypogaea** L.) seed proteins were extracted from the defatted meal with 0.01 M sodium phosphate buffer, pH 7.0, containing 0.5 M NaCl and 0.05% NaN_3 and resolved into four major and six minor fractions by HPLC. The mol. wt. of these fractions ranged from 80 000 to 480 000. By this technique, variation in protein composition was detected in peanut seeds of different genotypes, boiled seeds, and seeds of different maturities. The data showed that HPLC can be successfully used to detect qualitative and quantitative differences in peanut seed protein composition. **AS**

Hazelnuts

876 Schneeberger (R), Villarroel (M), Drapela (N), Caire (F) and Castillo (M). Kinetics of the extraction of hazelnut. **Crasas Y Aceites** 39(3); 1988; 151-154 (Es).

The influence of the nut geometry, the length of the extraction, and the temp. on kinetics of the extraction of the hazelnut oil by solvents has been studied. Based on the results obtained in this work it can be concluded that the kinetics of the extraction of the oil by solvents in hazelnut cells, not deteriorated, is controlled by a diffusion kinetics. The apparent diffusion coeff. in the given experimental conditions varied between 5 x 10^{13} m^2 s less than or equal to D_A less than or equal to $_A$20 x 10^{13} m^2 S. The activation energy reached a value of Delta E = 24.4 kj/ mol. The size of the nuts(y) to extract 90% of the oil in a time of t = 3,600 s, considering that the N^0 of Biot is B_i = infinity, resulted to be Y less than or equal to 10^{-3} m. Microscopic studies on histological sections of nuts led to the conclusion that the fatty vacuoles show a regular form and an uniform size, with a mean diameter of 45 x 10^6 m. **AS**

Sesame

877 El-Sawy (AA), Soliman (MM) and Fadel (HM). Identification of volatile flavour components of roasted red sesame seeds. **Crasas Y Aceites** 39(3); 1988; 160-162

Volatile flavour components of roasted sesame seeds were studied. The volatile components were obtained by roasting under reduced pressure. The volatile extract was separated into neutral-acidic and basic fractions. All fractions were analysed by gas liquid chromatography and mass spectrometry. It was clear that octanal 2, 4, undecadienal and 3-methyl butanal are represented by high concn. (40.18%, 32.89% and 8.36%; resp.), in the neutral-acidic fraction. Among the components of basic fraction, 2, 3-dimethyl pyrazine, 2, 5-dimethyl pyrazine, 2-ethyl pyrazine and 2, 5-diethylpyrazine, are found in large concn. (24%, 25.4%, 10.88% and 12.97%, resp.). 2-furfuryl alcohol which is considered as one of the most characteristic compound giving the pleasant roasted aroma of sesame seeds is present in higher concn. in red and white ones. AS

Soybeans

878 Barimalaa (IS) and Gordon (MH). Cooxidation of Beta-carotene by soybean lipoxygenase. **Journal of Agricultural and Food Chemistry** 36(4); 1988; 685-687

The factors affecting the rate of the cooxidation reaction catalysed by a natural mixture of soybean lipoxygenase isoenzyme were studied at neutral pH, which is close to the pH of soybean flour dispersed in water. MVG

879 Hidalgo (FJ), Zamora (R), Alaiz (M), Millan (F), Maza (MP) Vioque (E). Reliable method to separate phospholipids from commercial soybean lecithin. **Crasas Y Aceites** 39(3); 1988; 180-181 (Es).

A column chromatographic method with silicic acid-celita as adsorbent to obtain phosphatidylethanolamine, phosphatidylcholine and phosphatidylinositol is described. A gradient eluent of chloroform-methanol (10:1) to chloroform-methanol (2:1) is used. AS

Soy proteins

880 Afify (AEMR) and Shousha (MA). Effect of low-dose irradiation on soybean protein solubility. Trypsin inhibitor activity, and protein patterns separated by polyacrylamide gel electrophoresis. **Journal of Agricultural and Food Chemistry** 36(4); 1988; 810-813

Five soybean cvs were used in this study to investigate changes in soybean protein solubility, protein patterns separated by SDS-PAGE and Poro-PAGE, and activity of trypsin inhibitor after exposure to gamma irradiation. SDS-PAGE proved that changes in protein subunits patterns could be identified in the Clark cultivar. Three high mol. wt. protein bands were detected in irradiated soybean cultivars by using Poro-PAGE. AS

881 Mohan Reddy (I) and Narasinga Rao (MS). Interaction of gossypol with gossypin (11S protein) and congossypin (7S protein) of cottonseed and glycinin(11S protein) of soybean . 2 Effect of pH, ionic strength, and temperature. **Journal of Agricultural and Food Chemistry** 36(4); 1988; 698-703

The interaction of gossypin, congossypin, and glycinin with gossypol was studied by the difference spectral technique as a function of pH, ionic strength, and temp. With gossypin, an increase in pH decreased the binding constant to a min. and then caused an increase.

In the case of congossypin, an opposite effect was observed while with glycinin a continuous decrease in binding was seen. Increasing the ionic strength decreased the binding affinity, and increasing the temp. increased the binding affinity in the case of gossypin and congossypin while it decreased in the case of glycinin. **AS**

TUBERS AND VEGETABLES

Onions

882 Lu (JY), Stevens (C), Yakubu (P), Loretan (PA) and Eakin (D). Gamma, electron beam and ultraviolet radiation on control of storage rots and quality of Walla Walla onions. **Journal of Food Processing and Preservation** 12(1); 1988; 53-62

Walla Walla onions were irradiated with doses of 0.1, 0.3, 1.0, 2.0, and 3.0 kGy of gamma rays; 0.1, 1.0, 2.0, 3.0 and 5.0 kGy of electron beams; or 0.44×10^4, 1.32×10^4, 3.52×10^4, 7.33×10^4 and 19.1×10^4 erg/mm plus or minus of UV. The onions were stored up to four wks at 20-25 C. UV irradiated onions exhibited the greatest percentage of marketable onions and reduction in postharvest rots. Sprouting was observed with control, UV and electron beam irradiated onions but not with gamma irradiated onions. Effect of gamma, electron beams and UV on pH, moisture, ascorbic acid and colour were not significant. Onions became soft with the high dose of gamma radiation (3.0 kGy). Total sugar content was not affected by UV and electron beam but tended to be greatest at the 1.0 kGy gamma radiation. The effect of the radiation on the onion sensory scores was not clearly indicated except that 3.0 kGy gamma ray irradiated onions had the lowest firmness score. **AS**

Root vegetables

883 Singh (U) and Bradbury (JH). HPLC determination of vitamin A and Vitamin D in South Pacific root crops. **Journal of the Science of Food and Agriculture** 45(1); 1988; 87-94

An HPLC method was developed for the analysis of alpha-carotene, beta-carotene, retinol and vitamin D_2. Sweet potato **Ipmoea batatas**, taro, **Colocasia esculenta**, taro **Xanthosoma sagittifolium** giant taro **Alocasia macrorrhiza** giant swamp taro **Crtosperma chamissonis**, yam **Dioscorea alata** and **D. esculenta** contained no appreciable amount of alpha-carotene, retinol or vitamin D_2 and the amounts of beta-carotene were equivalent to 0-300 μ g kg retinol in the fresh samples. This small amount, compared with the WHO/FAO adult RDA of 750 μ g day^{-1}, and the virtual absence of vitamin. A related eye diseases in the South Pacific region, demonstrates the adequacy of greens and fruits, and fish coastal areas, in meeting the vitamin A requirement. **AS**

Carrots

884 Berna (A), Rossello (C), Mulet (A) and Catala (P). Food dehydration with solar energy I. Description of a pilot dryer and exploratory tests with carrots. **Revista de Agroquimica y Tecnologia de Alimentos** 28(2); 1988; 241-250 (Es).

A pilot solar dryer with a chamber of 8.64 m^2 evaporation surface and a collector field of 21.30 m^2 was built. After setting the system, carrots were dried and the results compared with open sun drying. The carrot drying rate in the pilot dryer, at loadings of 10/kg m^2 , is higher than for direct solar exposition. At loadings of 5 kg/m^2 this situation is quite the opposite. The observed drying kinetics in the pilot agrees with previous result at 30 C temp. and 1000 kg/m^2 air flow. Carrots dehydrated in the pilot dryer rehydrated as well as those conventionally dried, showing good sensory, quality. AS

Cassava

885 Regez (PF), Zorzi (N), Ngoy (K) and Balimandawa (M). Evaluation of the importance of some strains of **Lactobacillus** sp. for the acidification of traditionally processed cassava foods. **Lebensmittel-Wissenschaft und-Technologie** 21(5); 1988; 288-293 (Fr).

During the traditional processing of cassava bread (**chikwangue**) and puree (**malemba**) the development of the pH values and of the contents of fermentable sugars was analysed. 76 strains of Lactobacillus sp. were isolated from cassava pulp and cassava dough and identified. 31 of these strains were tested for their capacity of acidification in a model substrate. Finally, acidification during traditional processing was compared to the HCN content at different stages. Among the strains of lactobacilli isolated and identified, **Lactobacillus plantarum** showed the best acidification capacity, followed by L. casei. L. **fermentum** and L. **brevis**. The results for pH, fermentable sugars and HCN complete earlier studies made in Zaire and elsewhere. The spontaneous multiplication of lactobacilli during traditional processing is satisfactory if retting in water is involved. In the cases of a recipe without retting or of industrial cassava processing, the use of a starter culture of L. **plantarum** should positively influence the microbiological and organoleptic quality of the product. Even if the diminution of HCN is not directly related to the lactic acid fermentation, the analyses have confirmed that both the major acidification as well as the disappearance of this toxic substance take place at the retting stage. AS

Tubers

Potatoes

886 Martindale (RW). Determination of residues of a range of fungicides, antisprouting agents and (organochlorine and organophosphorus) insecticides in potatoes by gas-liquied and high-performance liquid

chromatography. **Analyst** 113(8); 1988; 1229-1233

A method is described for the assay of residues of a range of pesticides in potatoes. The analytical scheme includes published methods, suitably modified and incorporated into a streamlined multi-residue procedure. AS

887 Munshi (CB) and Mondy (NI). Effect of soil applications of molybdenum on the biochemical composition of Katahdin potatoes. Nitrate nitrogen and total glycoalkaloids. **Journal of Agricultural and Food Chemistry** 36(4); 1988; 688-690

The effect of molybdenum on nitrate nitrogen (nitrite-N) and total glycoalkaloid (TGA) content of Katahdin potatoes was investigated. Sodium molybdate was applied to the soil at rates of 0, 2.5, 6, and 9 lb/acre 1 day prior to planting. At all levels of molybdenum application, nitrite-N and TGA content decreased significantly ($P < 0.01$) from the controls. The greatest decrease occurred at the highest level of molybdenum application. AS

888 Schadlich (H), Flemming (Ch), Gabert (A) and Taufel (A). Purfication by affinity chromatography and characterization of two permanent thermitase inhibitors from potatoes. **Nahrung** 32(2); 1988; 91-107 (De).

An HCl-extract from potato tubers "Mariella" can be separated by PAGE into 7 protein bands, two of them are without inhibitor activity toward trypsin, chymotrypsin and thermitase. The remaining bands represent the potato inhibitor 1, which is isolated by affinity chromatography using trypsin-sepharose 4B as adsorbent. A second group of inhibitor proteins inactive toward trypsin is separated by affinity chromatography with subtilisin sepharose 4B. This specifically bound inhibitor-potato inhibitor II-is homogeneous in PAGE, the molar mass is 14 kg/mol. Potato inhibitor II is active toward thermitase, subtilisin and chymotrypsin. Only by a combination of two affinity sorbents (trypsin-subtilisin or thermitase-trypsin sorbents) pure potato inhibitors are obtained. AS

Potato flour

889 Kulkarni (KD), Kerure (YE) and Kulkarni (DN). Evaluation of potato cultivars for flour production. **Beverage & Food World** 15(3); 1988; 21-25

Based on chemical composition, processing qualities and functional properties, Kufri chamatkar var. of potato was found most suitable for processing of potato products. BV

Potato starch

890 Sugimoto (Y), Tokunou (K), Yamamoto (M) and Fuwa (H). The effect of temperature and duration for preservation of starch granules on numerical values of Brabender amylograms of starch pastes. **Journal of the Japanese Society of Starch Science '(Denpun Kogyo Gakkaishi')** 35(3); 1988; 179-182 (Ja).

The effect of temp. (37 C, room temp., 5 Degree C) during preservation of starch granules on numerical values of Brabender amylograms of potato, normal, and waxy-maize starches (concn. of starches was 3, 8, and 6% resp.) was investigated. Results indicate that the viscosity of potato starch decreased remarkably during preservation. The effect of temp. during preservation on the Brabender viscosity of potato starch was great. The viscosity was in decreasing order at 5 C, room temp., and 37 Degree C. The max. viscosity of Brabender amylograms of potato starch after 28-wk preservation of starch granules decreased 74.1% at 37 degree C, 34.1% at room temp. and 9.5% at 5 C resp. The max. viscosity of Brabender amylograms of normal-maize starch decreased slightly during preservation of starch granules, but other viscosity characteristics decreased after 20 wk. preservation of starch granules. The viscosity of normal maize starch decreased slightly in decreasing order at 5 C, room temp., and 37 C preservation. The max. viscosity of waxy-maize starch tended to decrease slightly during preservation of starch granules and the effect of temp. during the preservation was in decreasing order at 5 C, room temp., and 37 C. The other viscosity characteristics of waxy-maize starch decreased slightly at 37 C, but scarcely changed at room temp. and 5 C during preservation of starch granules. AS

Potato strips

891 Califano (AN) and Calvelo (A). Adjustment of surface concentration of reducing sugars before frying of potato strips. **Journal of Food Processing and Preservation** 12(1); 1988; 1-19

In this paper optimum conditions are proposed for effecting changes in profiles and surface concn. of reducing sugars during warm water blanching and subsequent holding of potato strips in hot air stream before frying in order to obtain the desired colour of the finished product. The proposed system allows the prediction of the best leaching conditions for time and temp. in terms of the initial sugar content of the potato tubers, the max. holding time before frying and the desired max. surface concn. of reduing sugars. NGKR

Vegetables

892 Garcia-Pino (CA), Garcia-Roche (MO), Symington (R), Fontaine (M), Navarro (N), Mojena (H) and Suarez (H). Influence of the nickel content in soil on the content of this metal in some vegetable products. **Revista de Agroquimica y Tecnologia de Alimentos** 28(2); 1988; 297-302 (Es).

The nickel content in tomato, onion, banana and lettuce was determined by atomic absorption spectrophotometry. The vegetable products were samples in a lateritic soil zone (Mayari) and a non-lateritic soil zone (Batabano). Nickel concn. in vegetables from Mayari were between 0'83 p.p.m. for tomatoes and 5'54 p.p.m. for lettuce. It was confirmed that the nickel content in the soil and the vegetables type are two factors affecting the nickel levels in the vegetable products. Nickel contents in lettuce from Mayari were higher than the established tolerance level in COMECON countries, and could be a toxicological risk for consumers. AS

893 Stehil (D), Bachmann (MR) and Escher (F). Dehydration of vegetables with natural air convection. **Lebensmittel-Wissenschaft und-Technologie** 21(5); 1988; 294-302 (Fr).

Carrots, French beans, parsley, pimientos, onions and mushrooms were dried in an air-dryer that was operated with natural air convection and with solar energy or gas heating. Drying rates and product quality were determined and compared to those obtained with a convectional air-dryer with forced air circulation at higher air velocities. In the constant drying range, drying rates of air-drying with natural convection are considerably lower than drying rates of force-air drying. Equally, overall drying capacities are lower with natural convection than with force-air convection. The influence of air velocity is very much dependent on the structure and the composition of the various vegetables. In point of view of product quality, reconstituted vegetables dried with natural air convection cannot be distinguished from products dried with force-air circulation at higher air velocities. AS

894 Stehli (D), Oswald-Kuhlmann (D), Bachmann (MR) and Escher (F). Dehydration of vegetables with natural air convection. 2. Influence of the pretreatment on the microbial quantity. **Lebensmittel-Wissenschaft und-Technologie** 21(5); 1988; 303-306 (Fr).

The influence of 5 different pretreatment methods on the microbial quality was investigated, while drying at low air flow. Fresh carrot dices were contaminated with **Bacillus subtilis** and **E. coli** each to an initial count of 10^5 to 10^6 microbes per gram. The counts of the colony forming units and of both contaminants were analyzed after each the pretreatment, the drying and a one-month storage. Water blanching, blanching in a lactic acid solution and in a NaCl solution resulted in the highest reduction of the coliforms ($10^{4.7}$ to $10^{3.}$) and the colony forming units ($10^{-1.70}$ to $10^{-1.01}$). These two parameters only decreased by more than 1 10-power during the drying step when soaking in either a NaCl- or lactic acid solution. The aerobic spores on the other side were in all cases more destroyed by the drying step ($10^{-0.24}$ to $10^{4.22}$) than but the pretreatment ($10^{-0.55}$ to $10^{-0.12}$). AS

Asparagus officinalis

895 Bottcher (H). Quality changes of asparagus (**Asparagus officinalis** L.) during storage. Part I. External and sensoric quality traits. **Nahrung** 32(2); 1988; 179-187 (De).

Averaging the data of 8 test series on the storage of white asparagus packed in cellophane at temp. of + 0.5, 4 and 14 to 20 C, a degressive trend of quality changes was recorded in dependence on the storage period (x in days). They concern fresh wt. losses, external quality, flavour and consistency according to the regression equation $y = \text{alpha}_0 - \text{beta}_I\ x + \text{beta}_{II}\ x^2$. Colour, general impression and odour, however, deteriorated linearly. When **Asparagus** was packed in perforated cellophane film to avoid wilting, infestation by microorganisms primarily at the end of the stalks turned out to be an important component of external quality. Beside bacterial rot (**Erwinia caratovora** var., **caratovora** (Janes Dve u.a.) mainly **Fusarium** sp. (less than or equal to 4 C storage temp.) and **Penicillum** sp. (less than or equal to 4 C C storage temp. were observed. All quality traits of asparagus proved to depend more dominantly on the storage temp. than on annual growing and cropping conditions. External quality limits shelf-life much more than sensoric characters. The shelf life (y in days) which is related to temp. can be reflected for packed white asparagus by the regression equation $y = 38.328.\ e^{-0.325}$ Theta (Theta = storage temp. in C). AS

896 Bottcher (H). Quality changes of asparagus (**Asparagus officinalis** L.) during storage. Part 2. Nutritional quality. **Nahrung** 32(2); 1988; 189-200 (De).

In storage tests extending over several yrs. under defined temp. (+ 0, 5 to 20 C) typical changes of white asparagus packed in cellophane (protection against transpiration) were studied in depence on the storage period (x in days). Respiration processes cause mostly a linear decrease of the dry matter content and a linear increase of dry. matter losses in the product. The characteristical decrease of vitamin C (ascorbic acid and dehydro-ascorbic acid) can be expressed by the equation $y = \text{alpha}_0 + \text{Beta}_1\ e^{-c\,\text{Theta}^x}$ for concn. changes and by $y = \text{Beta}\ (1-e^{c\,\text{Theta}^x})$ for the losses, in that $c\ \text{theta}$ represents a measuring index for the rate of change per unit of time. Under cool storage co ndtiions (+ 0, 5 to 4 C) a rise of the dehydro-ascorbic acid concn. is recorded with increasing storage time. The primarily linear decreases of the total saccharide content must be explained by the lowering of the monosaccharide concn. according to the equation $y = \text{Alpha}_0 - \text{Beta}_1\ x^{0,5}$ The increase of disaccharides under cool storage conditions (+ 0, 5 C) is interpreted as a form of matter production for sinking. The titratable total acid concn. drops by 10 to 22% only. The great influence of the storage temp. on changes of constituents could be statistically proved and reveals a significant decline of the regression coeff. for the different temp. provided, whereas annual cropping conditions had a marked effect on saccharides only. All results are elucidated from the physiological point of view. AS

Broccoli

897 Ballantyne (A), Stark (R) and Selman (JD). Modified atmosphere packaging of broccoli florets. **International Journal of Food Science and Technology** 23(4); 1988; 353-360

In this study the suitability of a range of semipermeable packaging materials for production of aerobic equilibrium-modified atm. and the effects of these modified atm. on the quality of broccoli florets during chill temp. storage have been assessed. A range of polymer films of various gas permeabilities viz. oxygen perimeability 3000-32500 ml/m^2 day/atm. was used to develop modified atm. within sealed packages of prepared broccoli florets, three methods of sealing were tried and modified atm. were developed both naturally by resputation and by gas flushing technique. The sensory quality was observed by evaluating colour changes and off-odours. It was seen that a 2-3% oxygen, 2-3% carbon doxide equlibrium modified atm. was established using these films to package broccoli florets when stored at 5 C. The only consistently aerobic MA obtained did not markedly improve retention of quality when compared to storage in air when the broccoli florets were packed with films resulting in very low oxygen atm. (1% or below) foul off-odours developed. NGKR

Cucumbers

898 Kanellis (AK), Morris (LL) and Saltveit (MEJr). **Responses of parthenocarpic cucumbers to low-oxygen storage. Journal of the American Society for Horticultural Science** 113(5); 1988; 734-737

The main objective of this study was to determine the critical oxygen level for aerobic respiration of parthenocarpic cucumbers. Production of carbon dioxide, C_2H_4, ethanol, acetaldehyde and consumption of oxygen also were studied in CA at 12.5 C. The effect of low oxygen storage on retention of visual quality was also studied. The methodology of oxygen exp. is described in detail. BAP

Leafy vegetables

Amaranthus cruentus

899 Calderon De La Barca (AM) and Vazquez-Moreno (L). **Amaranthus** cruentus lectin. Purification, stability, and some biochemical properties. **Journal of Food Biochemistry** 12(2); 1988; 117-126

The conditions for amaranth lectin purification, partial characterisation and factors that influence its biological stability have been described in this paper. The amaranth lectin from **Amaranthus** cruentus seeds was isolated, purified and partially characterised. The purification method used was based on its ability to interact with fetuin. The effects of temp., pH and buffers and concn., were determined by measurement of lectin haemaglutination activity. It was seen that amaranth lectin biological activity was best maintained at temp. between 4 and 30 C. and pHs above or below 5. It was also found possible to store amaranth lectin at 4 C in acetate buffers, pH 4.8, for prolonged periods and to conc., it 10 times by ultrafiltration with loss of activity only by 18%. NGKR

Lucerne juice

900 Hanczakowski (P) and Skraba (B). The nutritive value of native and modified lucerne juice for rats. **Journal of the Science of Food and Agriculture** 45(1); 1988; 9-19

An attempt was made to improve the nutritive value of lucerne juice as a protein source for rats. Diets, based on ground barley and lucerne juice, were supplemented with amino acids (methionine and/or lysine) polyethylene glycol (to neutralise phenolic compounds), cholesterol (to neutralise saponins), or fat. In one diet the content of calcium and potassium was lowered. Aerobic fermentation of juice with or without yeasts was also carried out. The biological value (BV) and true digestibility (TD) of proteins were estimated using the Thomas-Mitchell balance method. The amino acid supplement improved the BV of protein from 52 to 57 as a result of its supplementary effect on barley rather than juice protein. The addition of polyethylene glycol (PEG) had an adverse effect on the nutritive value of the mixture (BV was reduced from 48 to 39). the BV of proteins was slightly lowered by aerobic fermentation with or without yeasts (control 42, 41 and 37, resp.) but difference were not statistically significant. The effect of lucerne juice and casein on apparent digestibility of basal nutrients was also compared. Lucerne juice had an adverse effect on digestibility of all nutrients, especially fibre, and on availability of minerals, which may have been caused by changes in the caecum of the rats. AS

Tomatoes

Tomato soups

901 Shephered (R), Griffiths (NM) and Smith (K). The relationship between consumer preferences and trained panel responses. **Journal of Sensory Studies** 3(1); 1988; 19-35

Eight samples of dried tomato soups were profiled by a trained panel, who also provided ratings of overall liking and liking for particular attributes on relative-to-ideal rating scales. A consumer panel tested a subset of four of the soups in home trials, assessing them for overall liking and for particular attributes on either hedonic or relative-to-ideal rating scales. The pattern of overall preferences differed between the trained and untrained panelists, demonstrating the inappropriateness of using trained panelists to provide measures of preference or acceptance. The conclusions regarding consumer preferences would differ depending on which rating scale was used; these differences disappeared when the relative-to-ideal ratings were converted into values of the same form as the hedonic ratings. The overall liking was best predicted by flavour rather than colour or thickness. A principal components analysis (PCA) of the profile data compared well with a plot based on the trained panel preference data using MDPREF. The preference data were also fitted to the PCA dimensions using the PREMAP vector model, which gave a good fit for only six of the 15 trained panelists; the PREMAP ideal point model failed to show a better fit. In order to test these models adequately more than eight samples would need to be tested. AS

FRUITS

902 Masuda (R), Hayakawa (A), Kakiuchi (N) and Iwamoto (M). HPLC determination of total ascorbic acid in fruits and vegetables. **Report of the National Food Research Institute '(Shokuryo Kenkyusho Kenkyu Hokoku')** 63(3); 1988; 30-35

A simple HPLC method was developed for the rapid estimation of the total ascorbic acid (total AA: ascorbic acid (AA) + dehydroascorbic acid (DHA). AA in a solution of Satsuma mandarin was separated in 5 min on an ODS column using 1.5% ammonium biphosphate (pH 3.0) as a mobile phase, and was detected at 254 nm. Total AA was successfully measured by reducing DHA to AA with 1% dithiothreitol (DTT). The complete reduction was attained at less than 0.5% of metaphosphoric acid. The method gave almost 100% recovery of added DHA in satsuma mandarin and pears, and was applied to the estimation of the total AA content of cabbage and orange juice. AS

903 Panchev (I), Kirchev (N) and Kratchanov (C). Improving pectin technology. II. Extraction using ultrasonic treatment. **International Journal of Food Science and Technology** 23(4); 1988; 337-341

In this study the use of ultrasonic extraction to maximise yield of undegraded pectin with efficient separation of the liquid and solid phases has been discussed. In this investigation the pectin was extracted under conditions to minimise degradation of pectin without reducing the drainage properties of the extracted fruitmass. For this purpose a pulsed ultrasonic method in aqueous acidic medium was developed and this was successfully tested with three different apple pomace samples and the advantages of this method have been demonstrated. NGKR

Apples

904 Aworh (OC) and Nakai (S). Separation of sodom apple proteinases by gel filtration. **International Journal of Food Science and Technology** 23(4); 1988; 419-423

The uses of sodom apple (**Calotropis procera**) grown in East and West Africa, the leaves of which used as a milk coagulant for traditional cheesemaking has been further studied for efficient methods of recovery of these enzymes from the leaves for commercial cheesemaking or other applications. This paper describes a method for separating sulphydryl proteinases from these leaves. It has been seen by this method of first reversibly blocking sulphydryl groups in the crude enzyme with sodium tetrathionate followed by gel filtration it has been found possible to obtain good recoveries of the enzyme activity. NGKR

905 Dick (AJ) and Bearne (SL). Inhibition of Beta-galactosidase of apple by flavonoids and other polyphenols. **Journal of Food Biochemistry** 12(2); 1988; 97-108

The inhibition of purified Beta-galactosidase from "Spartan" apples by flavonoids and related compounds has been studied with a fluorimetric assay using the substrate 4-methylumbelliferyl Beta-D-galactoside. Certain flavonoids, flavonoid glycosides, phenolic acid, and polyphenols (quercetin, fustin, rutin, p-coumaric acid, and catechol) gave classical noncompetitive inhibition at moderate substrate concn. Others (kaempferol, chlorogenic acid) gave nonlinear Dixon plots. The best inhibitors were flavones. In general, the degree of inhibition increased with the degree of hydroxylation and glycosylation of the phenol. Correlation of the structure of these substances with the observed inhibition suggests that the trans-3-(-4-hydroxyphenyl)-propenoyl group, common to 4'-hydroxyflavones and p-hydroxyphenolic acids, is important for effective inhibition. **AS**

906 Gatti (GC), Zobol (G), Colomibini (L) and Lanzarini (S). Gas-chromatographic method for the determination of Dodine residues on samples of apples. **Industrie Alimentari** 27(258); 1988; 274-276 (It)

A gas-chromatographic method for the detn. of Dodine residues on samples of apples has been developed. The fungicide was taken out with methanol, portioned with chloroform, derivatizated with trifluoroacetic anydride and analyzed with G.C./T.D.S. The confirmation of the active principle was carried out by G.L.C./M.S. The obtained recoveries are superior to 90% and the detectability on apples is 0.01 µ g/g. **AS**

907 Moulding (PH), Singleton (DE), McLellan (KM) and Robinson (DS). Purification and heat stability of Cox's apple pulp peroxidase isoenzymes. **International Journal of Food Science and Technology** 23(4); 1988; 343-351

Three peroxide isoenymes, two anionic and one cationic, were isolated from extracts of apple pulp using gel filtration and ion-exchange chromatography. The homogeneity of the purified isoenzymes was established by isoelectric focusing and staining for peroxidase activity. The isoenzymes varied in their heat stability; the anionic isoenzymes were found to be more heat stable than the cationic isoenzyme. The measured enzymic activity of the isoenzymes was greatest when O-dianisidine was used as the test substrate. After heating solutions of the anionic isoenzymes at 80-100 C for 2 min, up to 80% of the original enzymic acivity was observed to regenerate when the heat-treated isoanzymes were held at 30 C for 1 h. Regeneration of enzymic activity following heat inactivation was not observed for the cationic isoenzyme. **AS**

908 Murphey (AS) and Dilley (DR). Anthocyanin biosynthesis and maturity of `McIntosh' apples as influenced by ethylene releasing compounds. **Journal of the American Society for Horticultural Science** 113(5); 1988; 718-723

Two chemicals `ETHEPHON' and `CGA15281' were used as ethylene-releasing compounds in `McIntosh" apples for improving the skin colour (anthocyanin pigment) development without triggering the ripening process in the treated apples. Of the two chemicals, the most satisfactory increase in anthocyanin development with mineral loss of firmness was obtained with `CGA 15281'. The activity of the two chemicals at various pHs , temp. and the time of their applications were described in detail. BAP

Avocadoes

909 Dallman (TF), Eaks (IL), Thomson (WW) and Nothnagel (EA). Postharvest density changes in membranes from ripening avocado fruits. Journal of the American Society for Horticultural Science 113(5); 1988; 729-733

An investigation was performed at the biochemical level, organelles that undergo post-harvest changes during ripening at climactric stage and post-climactric stage in avocado fruits (**Persea americana**, Mill Cv. Hass). Mesocarp tissue at defined stages ripening were isolated and studied along with Golgi and Plasma membranes for buoyant characteristics. Several changes in these organelles in relations to changes in polypeptide band pattern during ripening were noticed, which are presented. BAP

Berries

Blueberry

910 Smittle (DA) and Miller (WR). Rabbiteye blueberry storage life and fruit quality in controlled atmospheres and air storage. Journal of the American Society for Horticultural Science 113(5); 1988; 723-728

Fruits of rabbiteye blueberries (**Vaccinium ashei** Read cvs. Climax and Woodard) harvested by hand in 1984 and machine in 1985 were stored in air, 100% nitrogen and in 10%, 15% or 20% carbon dioxide with 5% oxygen. Storage of either blueberry cvs in high-carbon dioxide atm. resulted in greater percentages of marketable and firm fruit, and better sensory ratings, than did storage in air. Fruit of 'Climax' lost less wt., were firmer, and developed less decay after 21 or 42 days of storage than 'Woodard' fruit. Fruit quality characteristics of hand-harvested 'Climax' stored for 42 days and machine-harvest 'Climax' stored for 21 days in 20% carbon dioxide with 5% oxygen were similar to those of freshly harvested fruit. AS

Cherries

911 Torreggiani (D), Forni (E) and Rizzolo (A). Osmotic dehydration of fruit. Part. 2. Influence of the osmosis time on the stability of processed cherries. Journal of Food Processing and Preservation 12(1); 1988; 27-44

In this paper the results of exp. on the osmotic dehydration of three cvs of cherries under various conditions and their evaluation during processing and storage. The influence of osmosis time on the stability of "Vottoria" Durone Nero I" and "Starking" cvs was studied by osmodehydrating for 2, 4, 6 h, vacuum packed pasteurised and then the samples were analysed for ascorbic acid, glucose fructose and maltose by HPLC, pH, total acidity, dry matter, colour and for organoleptic characteristics during the process and storage period of six months. The results showed that the dehydration of the fruit and the exchange with the osmotic syrup took place mainly in the first two h of the process. It was seen that no substantial differences in chemical and organoleptic characteristics were noted in the cherries processed for different times and the importance of the var. is indicated by the colour data and two h osmodehydration process is found to be optimum for acceptable product quality. NGKR

Jujube

912 Al-Niami (JH) and Abbas (MF). The effect of temperature on certain chemical changes and the storage behaviour of jujube fruits (**Zizyophus spinachristi** (L.), willd). **Journal of Horticultural Science** 63(4); 1988; 723-724

Kiwifruits

913 Lewis (DA) and Luh (BS). Development and distribution of actinidin in kiwifruit (**Actinidia chinensis**) and its partial characterization. **Journal of Food Biochemistry** 12(2); 1988; 109-116

The proteolytic enzyme from kiwifruit has been characterised, the distribution of the enzyme throughout the fruit, optimum time for postharvest extraction for its utilisation as a meat tenderiser have been investigated in this study. The results revealed that the actinidin activity in kiwifruit increased by 3 times after 3 wks of postharvest ripening at 5 C with a 15% decrease in specific activity. It was also seen that the actinidin activity is highest in the pulp of ripe fruit at 27,600 µ /kg fruit. The thiol protease actinidin was also extracted from kiwifruit and purified 26 times to a specific activity of 57 u /mg. NGKR

914 Roudot (A-C), Duprat (F) and Nicolas (J). Slice imaging to quantify kiwifruit storage defects. **Sciences des Aliments** 8(3); 1988; 369-381

The use of digital image analysis is proposed for the study of kiwifruit slices. After digitization of the kiwifruit slice image obtained under proper illumination conditions, special algorithms were developed for the detn. of the different parts, namely outer pericarp, inner pericarp and central core. Both the relative area and the mean grey level were quantified objectively. Three lots of 30 kiwifruit each stored during 24 wks under normal air, controlled atm. (2% oxygen + 5% carbon dioxide) and intermittent 30% carbon dioxide atm. exposure (during a six wk period followed by 18 wks under normal air) were compared. The cores of the controlled atm. fruit were significantly greater and clearer than those of the normal air fruit whereas those of the intermittent high carbon dioxide treatment were intermediary. Moreover, this image technic provides the ability to detect and quantify objectively defects such as the water soaking appearance of the kiwifruit. AS

Mandarin oranges

915 Masuda (R), Hayakawa (A), Kawano (S) and Iwamoto (M). Effects of dropping impact and vibration on organic acids of Satsuma mandarin fruit. Principal component analysis. **Report of the National Food Research Institute '(Shokuryo' Kenkyusho Kenkyu Hokoku')** 63(3); 1988; 36-46

(Ja).

The data of the organic acid content was analyzed by statistical principal component analysis (PCA). Results indicate with respect to two major organic acid, citric and malic acids, their decreasing rate were enhanced in dropped fruit, independent of the number of dropping. The same tendency was not observed in vibrated fruit, and in some cases changes of organic acid content during storage of 3 days were more largely than that of 7 day. Among the minor organic acids, alpha-ketoglutaric, pyroglutamic, succinic and formic acids increased in dropped fruit during the storage. On the other hand, pyroglutamic and formic acids increased in the vibrated sample. A 1.5 G for 30 min vibration largely increased succinic and iso-citric acids. Dropped fruit showed increase of free amino acid content during storage for a wk. Contents of 11 organic acids in fruit during storage were analyzed by PCA. Consequently, first three principal component accounts for 68% of the total information. The first principal component indicates the amount of organic acids, while the second one shows minor organic acid content, the third one indicates succinic, formic acid alpha-ketoglutaric acid content. Three groups dropped fruit after storage of 7 days, dropped fruit after storage of 3 days, non-dropped fruit and vibrated one were discriminated each other on the plane with axis of Z1 and Z3. The influence of dropping on the organic acid composition in fruit was more significant than that of vibration, and the effect of dropping on those acids was observed more clearly during the storage for a wk. AS

Mangoes

916 Khurdiya (DS) and Vidya Ram). Effect of pH and temperature on carotenoid pigments in mango pulp. **Beverage & Food World** 15(3); 1988; 19-20

Addition of citric acid to mango (Chausa, and Amrapali) pulp to lower the pH below 4.0 was found to be sufficient for max. retention of the total carotenoid pigments. A general tendency is of decreasing carotenoid pigments with increase in the temp. irrespective of pH values. In Amrapali pulp the carotenoid pigments increased with increase in temp. upto 70 C. BV

Marula

917 Gous (F), Weinert (IAG) and Van Wyk (PJ). Selection and processing of marula fruit (**Sclerocarya birrea** subsp. **Caffra**). **Lebensmittel-Wissenschaft und-Technologie** 21(5); 1988; 259-266

Marula fruit from seven selected wild trees were processed into puree, turbid and depectinized juices during three consecutive yrs. Physical and chemical characteristics such as yield, moisture, total soluble solids, total titratable acidity, apparent viscosity, individual saccharides and organic acids, vitamin C, pectins, amino acids and minerals were determined. Complete results for turbid juices are given and compared with the other products. The data was used to aid in the selection of trees suitable for propagation for the establishment of a marula fruit industry in South Africa. AS

Pomes

918 Risch (B) and Herrmann (K). Contents of hydroxycinnamic acid derivatives and catechins in pome and stone fruit. **Zeitschrift fur Lebensmittel-Untersuchung und -Forschung** 186(3); 1988; 225-230

Various var. of apple, pear, apricot, peach, sweet and sour cherries and plum were investigated with regard to their contents of hydroxycinnamic acid derivatives and catechins. Epicatechin was predominantly found in pome and stone fruit, with the exception of peaches and plums, while the caffeoylquinic acids predominated in all the var. examined. In stone fruit, the 3-isomers are the major constituents, whereas the 5-isomers are found almost exclusively in apples and pears. Apples and plums contain different levels of p-coumaroyl glucose, feruloyl glucose and caffeoyl glucose and pears contain trace amounts of hyroxycinnamoylmalates. Free hydroxycinnamic acids, sinapic acid esters or hydroxycinnamic acid glucosides were not found in any of the samples studied. In order to achieve combined examinations of catechins and hydroxycinnamic acid derivatives, a known method for sample preparation was modified. After homogenization and extraction of the frozen or freeze-dried fruit tissue, the resulting aqueous solutions were fractionated by means of column chromatography on polyamide. Catechins and hydroxycinnamoyl glucoses were eluted initially with methanol. Quinates and malates of hydroxycinnamic acids were collected in a methanol 2% formic acid fraction. Analysis was performed by means of high performance liquid chromatography (HPLC) with a gradient system on reversed-phase material (RP-18). A profile analysis for a single var. of both apple and pear showed a distribution of the phenolic compounds in the peel, pulp and core of the fruit. AS

Strawberries

919 Kaneko (K), Hashizume (K), Ozawa (Y) and Masuda (R). Change in quality of strawberries by freezing and freeze storage. **Report of the National Food Research Institute '(Shokuryo Kenkyusho Kenkyu Hokoku')** 63(3); 1988; 18-24 (Ja).

Effects of the freezing method, the freeze storage temp. and the storage period on the changes in strawberry texture, the amount of drip, the tone of fruit colour and the amount of volatile components were studied. The texture was markedly deteriorated by freezing the fruits, and the deterioration depended on the freezing method. The freeze storage temp. and the storage period affected little on the texture change. Quick freezing of the fruits in liquid nitrogen resulted in occurrence of a smaller amount of the drip than slow freezing of them in a freezer at -20 C. The amount of the drip was also influenced by the freeze storage temp. generally it increased for about 9 months of the storage followed by a decrease. Change in the tone of fruit colour during the freeze storage was markedly influenced by the storage temp. Storage of the fruits at -40 C gave good results, and L value (colorimetrical value) and chroma were higher than those of the fruits freeze-stored at -20 C. The volatile components generally decreased with a few exception during the freeze storage of the fruits and the changes in the composition and the amount were influenced by the freezing method and the freeze storage temp. AS

920 Masuda (R), Kaneko (K), Hashizume (K), Ozawa (Y), Iino (K) and Yamashita (I). Effects of freezing method and the following storage conditions of strawberries on the quality of jam and juice drink. **Report of the National Food Research Institute '(Shokuryo Kenkyusho Kenkyu Hokoku')** 63(3); 1988; 25-29 (Ja).

Jam and juice drink were prepared from the frozen strawberries, and effects of the freezing method of the fruits and the following storage temp. and period on the quality of the products were studied by sensory test. The quality of the jam was little influenced by any of the freezing method, the following storage temp. and period. Freezing of strawberries did not disturb jam processing. On the other hand, the quality of the juice drink was markedly influenced by the freeze storage temp. of the fruits. The tone of juice colour was better in the case of the fruits stored at -40 C than at -20 C, and the results by colorimetry well coincided with those by sensory test. Freezing method had little effect on the quality changes in the juice drink. AS

CONFECTIONERY, STARCH AND SUGAR

Confectionery

Chocolates

921 Gerhard (N). Tempering, coating and cooling of chocolate. **Industrie Alimentari** 27(257); 1988; 119-124 (It).

922 Ziegleder (G) and Stojacic (E). Changes in the flavour of milk chocolate during storage. **Zeitschrift fur Lebensmittel-Untersuchung und -Forschung** 186(2); 1988; 134-138

The flavour of fresh and stored milk chocolates was analysed by means of gaschromatography/mass spectroscopy. Fresh samples produced by crumb processes revealed a typical caramel taste and contained relatively high amounts of furfurylic compounds. Stored samples contained two 3, 5-octadien-2-ones and some Delat-lactones. Their possible origin is discussed. As model reactions show, the generation of octadienones may be influenced by lipoxidases. AS

Starch

923 Imai (T), Kobayashi (H) and Shibata (S). Development of a micro-viscograph. **Report of the National Food Research Institute '(Shokuryo Kenkyusho Kenkyu Hokoku')** 63(3); 1988; 47-52 (Ja).

A new micro-viscograph has been developed with which starch viscography could be carried out using about 1 g of a sample. Accuracy and correlation of some characteristics on viscogram between the micro-viscograph and Brabender viscograph were investigated using various starches. Relationship between max. viscosity and logarithm of starch concn. in each starch sample was linear. Good correlation in max. viscosity and breakdown between the micro-viscograph and Brabender viscograph was confirmed. Regression lines of various starches were different each other. Min. amounts of samples required for the micro-viscograph to compare characteristics of the same kind of starch were about 0.4 g (potato), 0.8 g (waxy corn), 0.8, 1.0 g (sweet potato and normal corn) and 1.0 g (wheat). Coeff. of correlation in max. viscosity and breakdown between the microviscograph and Brabender viscograph with 19 starch samples prepared from wheat flours of various production areas and var. were 0.847 and 0.791 resp. It was concluded that with the micro-viscograph starch viscography was able to carried out using only about 1 g of the sample accuracy and the range of measurement of the micro-viscograph were almost same as those of Brabender viscograph, and the data obtained from the micro-viscograph sufficiently corresponded with those from Brabender viscograph. AS

924 Jackson (DS), Choto-Owen (C), Waniska (RD) and Rooney (LW). Characterization of starch cooked in alkali by aqueous high performance size-exclusion chromatography. **Cereal Chemistry** 65(6); 1988; 493-496

Commercial corn starches with different amylose-amylopectin (AMY-AMP) ratios were characterized using aqueous high performance size exclusion chromatography (HPLC-SEC). Starch (0.5%) was boiled water for 10 min. autoclaved for 10 min, sonicated for 20 sec, and centrifuged for 10 min. Molecularly dispersed starch in the supernatant was separated into AMP and AMY using water as the mobile phase. AMP mol. have a wider range of hydrodynamic vol. and apparent mol. wt. than do AMY molecules. Boiled and autoclaved starch was not molecularly dispersed in water. After sonication treatment, this cooked starch was molecularly dispersed in water without depolymerization, however, complete molecular dispersion was not achieved. Starch cooked with sodium hydroxide (NaOH) had increased water solubility, but starch was depolymerized or its effective diameter decreased at NaOH concn. of 0.001 N (0.047% w/w) and greater. The AMPHPLC-SEC profile was more affected by sonication, NaOH and CaO treatments than was AMY. CaO increased solubility and decreased starchy apparent mol. wt. or effective diameter, at levels as low as 0.005% CaO. An insoluble gel material was observed at 0.08% CaO it increased with increasing CaO levels. Solubilized starch cooked with CaO consisted mostly of AMP and a starch fraction with an elution volume between AMP and AMY. This aqueous HPLC-SEC technique permits characterization of water-soluble starch in food systems. AS

925 Subbaramaiah (K) and Sharma (R). Affinity binding of higher plant Beta-amylases to starch. A rapid purification method. **Starch/Starke** 40(5); 1988; 182-185

Crude preparation of Beta-amylase from mustard (**Sinapis alba** L.), barley (**Hordeum vulgare**) and sweet potato (**Ipomoea batatus**) after homogenisation in buffer, inactivation of Alpha-amylase by EDTA and ammonium sulphate precipitation were purified exploiting affinity of the enzyme to starch in a column. The enzyme binds, tenatiously to starch as various eluants as concentrated salt solution, Alpha-cyclodextrins and shift in elution pH could not significantly elute the bound enzyme. Never the less the enzyme could be rapidly eluted from starch with white dextrin (1% w/v). The eluted enzyme fractions consisted of Beta-amylase purified to homogeneity. SZA

926 Taki (M), Suzuki (K), Hisamatsu (M) and Yamada (T). Gel chromatography of residue and extract obtained from starch granules by hot aqueous 1-butanol solution treatment. **Starch/Starke** 40(5); 1988; 177-181

Starch granules of corn (normal, waxy, amylo and amylowaxy) and potato starch were treated with hot aqueous solution saturated with 1-butanol and fractionated. Fractionated starches were subjected to Toyopear HW 7SF gel permeation chromatography. Amylose of normal maize and potato starches was perfectly reached out from the granules, but that of amylomaize was not. Amylo and amylowaxy maize starches were proved to have a large amount of low -mol. wt. material. Normal and amylo maizes, and potato starches contained a high mol. wt. material recognized as amylose type, and it is strongly suggested that amylopectin of normal maize differed from that of waxy maize. GPC analysis is suggested to be an important step for estimation of amylose content since a part of the amylopectin made a pracipitatable complex with 1-butanol AS

927 Zobel (HF), Young (SN) and Rocca (LA). Starch gelatinization. An X-ray diffraction study. **Cereal Chemistry** 65(6); 1988; 443-446

Starch gelatinization was defined as the melting of starch crystallites, as determined by X-ray diffractions, in which the complete destruction of crystallite integrity was observed as a function of moisture content and temp. Melting occurred over a range of temp. and melting temp. increased as starch moisture content decreased. For moisture contents of 30% and higher, endothermic transitions determined by calorimetry were confirmed as reflecting loss of starch crystalline structure. The wide range of melting temp. was attributed to different degrees of crystallite perfection within the granule and to their respective interaction with granule moisture content. For nomral maize starch, heating caused formation of crystalline V-type complexes of amylose with granule fatty acids. Formation of these complexes partly explains differences reported for heat of gelatinization values of amylose lipid-bearing starches because of competing melting and crystalling effects X-ray analysis failed to confirm differential scanning calorimetry evidence of starch melting samples at moisture contents lower than about 30% and heated to temp. as high as 175 C. A glass transition was postulated to account for reports of apparent differential scanning calorimetry endotherms in such low-moisture starches. In the absence of an intermediate amorphous melt, the B to A or C structure changes observed in heat and moisture treated potato starches were interpreted as solid-state transitions. AS

BAKERY PRODUCTS

Biscuits

928 Gains (CS) and Finney (PL). Measurement of the water uptake rate of crackers. **Cereal Chemistry** 65(6); 1988; 471-473

Four types of commercial crackers baked by six commercial products for 12 flour were evaluated by a new, inexpensive method for assessing the internal structrue of those products i.e., water uptake. Data from the sorption method were compared to data from an instrument designed to evaluate the hardness of commercial cracker, the Biscut Texture Meter (BTM). The BTM has a lower coefficient of variation, however, rate curves from the water uptake method could predict the BTM values with an R of 0.9. Equipment for the water uptake method costs considerably less than the BTM. AS

Cakes

929 Guinot (P), Mathelouthi (M) and De Leiris (JP). Effect of low residual oxygen carbon dioxide on the preservation of carbon dioxide and nitrogen packed sponge-cake. **Acta Alimentaria** 17(2); 1988; 183-192

Preservation of sponge-cake in carbon dioxide/N atm. was studied, along with the choice of an appropriate packaging material. The effect of storage duration, temp., residual oxygen on mold growth, was investigated. Much more than the ratio of carbon dioxide in the atm., a low concn. of residual oxygen was found preponderant in growth inhibition. The effect of carbon dioxide on water activity of preserved sponge-cake was studied. It was found that an important decrease in water activity of thin slices of cake may be observed while it is very slowly decreased in thick samples. The decrease of water activity could be an important component of carbon dioxide action in carbon dioxide preserved baked goods. AS

Chapathis

930 Gandhi (AP) and Bourne (MC). Effect of added soybean paste and instant soydhal on toughness and rate of staling of chapathis. **International Journal of Food Science and Technology** 23(4); 1988; 411-414

The effects of addition of soy flour in wheat flour at two levels 10% and 20% on softening fresh chapatis and in greatly reducing the toughness developed during 24 h storage have been demonstrated in this study. Information on application of this technology in villages has also been given. Specially prepared Instant' soybean dhal and soypaste were used for blending with wheat flour for preparation of chapatis. The toughness of the chapatis and their sensory quality were evaluated together with their composition. The results showed that soypaste was more advantageous than Instant Soydhal from the standpoint of rural Indian Village that all the nutrients of the soybean are incorporated directly into a major staple food, substantial increase in the protein and fat content of the chapatis, imparts a softer texture to the chapati and reduces age toughening. The soy-paste can be developed as a cottage level industry at low costs as instant soydhal is capital intensive and needs sophisticated technology. NGKR

MILK AND DAIRY PRODUCTS

931 Dalgleish (DG). A new calculation of the kinetics of the renneting reaction. **Journal of Dairy Research** 55(4); 1988; 521-528

A detailed calculation of the growth of mol. wt. during the renneting of milk is given, based on a first-order breakdown of k-casein followed by development of instability caused either by a decrease in the intermicellar repulsive potential or by the formation of holes in the stabilizing surface layer of the micelles. Unlike most of the models which have been described, this model allows a complete analytical solution. The solution is, however, complex and difficult to use simply, although it is shown that the calculations are in accord with experimental observations of the dependence of the coagulation process upon the enzyme concn. and the concn. of the milk. The calculations are also compared with those from other models of the reaction. AS

932 Indyk (HE). Simplified saponification procedure for the routine determination of total vitamin E in dairy products, foods and tissues by high-performance liquid chromatography. **Analyst** 113(8); 1988; 1217-1221

A simple **in situ** saponification procedure is suggested which has advantages over the total lipid extraction procedure for estimation of vitamin E in humonised infant formula. Sample preparation is completed in a single test tube, within 45 min, followed by injection and quantification by high performance liquid chromatography. N

933 Shapton (N). Hazard analysis applied to control pathogens in the dairy industry. **Journal of the Society of Dairy Technology** 41(3); 1988; 62-63

The importance of hazard analysis applied to control pathogens in the dairy products is described in this paper. Incidences of listeriosis and salmonellosis traced to milk and milk products are also presented. Some of the definitions commonly used in HACCP are explained. Besides, certain ways of tackling risks in practice are discussed in details. MCV

Milk

934 Grandison (AS). Effects of natural (or seasonal) variation in concentration of components of milk and addition of divalent cations on UHT processing characteristics. **Journal of the Society of Dairy Technology** 41(4); 1988; 117-119

Interraltionships in composition of milk, ultra-high temp. processing behaviour and wt. and composition of deposits were investigated using bulked milks collected and processed at intervals over a one yr. period. The only statistically significant correlations of efficient run time with components of the milk were with concn. of Mg and casein. In a separate experiment 0.62-4.1 mM magnesium chloride was added to milk before processing. This gave rise to a large reduction in the processing time as predicted by this correlation. The addition of 0.375-2.5 mM calcium chloride gave comparable reductions in run time. AS

935 Griffiths (MW) and Phillips (JD). Modelling the relation between bacterial growth and storage temp. in pasteurised milks of varying hygienic quality. **Journal of the Society of Dairy Technology** 41(4); 1988; 96-102

The shelf-life of pasteurized milk was mainly determined by the level of contamination with gram-negative psychrotrophic bacteria. The length of lag phase of the bacteria was also important, although the generation times of the naturally contamination flora seemed to be of little relevance except for milks where the shelf-life exceeded 10 days at 6 C. The effect of temp. on growth of the contaminants could be accurately determined by the square root, plot but the conceptual min. temp for growth (T_O) varied. The variation was related to the quality of the pasteurized milk. Effects of temp. on generation time, length of lag phase and shelf-life were most marked at temp. below 15 C. The microflora of pasteurized milk varied significantly with storage temp. At refrigeration temp., spoilage was mainly due to the growth of **Pseudomonus spp** enterobacteriacese and gram-postive bacteria assumed greater importance in the spoilage of milks stored at temp. above 10 C. Milks of good quality also contained **Bacillus** spp.; and this group of bacteria were not detectable in milks with short shelf-lifes AS

936 Parnell-Clunies (E), Kakuda (Y), Irvine (D) and Mullen (K). Heat induced. Protein changes in milk processed by vat and continuous heating systems. **Journal of Dairy Science** 71(6); 1988; 1472-1483

Milk was pasteurized by vat heating, HTST, and UHT cooled and fractionated into whey and casein by isoelectric precipitation. Beta-lactoglobulins were totally denatured by vat processing and partially denatured by HTST and UHT. Denaturation of both beta-lactoglobulins was directly proportionate to holding time of HTST and UHT whereas alpha-lactoalbumin was also denatured in vat processing with prolonged heating time. Sulphydryl content and surface hydrophobicity SDS electrophoresis revealed presence of high mol. wt. protein component in casein. Addition of 2-mercaptoethanol released Beta-lactoglobulin and alpha-lactoalbumin from their casein complexes. JSS

937 Poffe (R) and Mertens (W). Rapid estimation of psychrotrophic and proteolytic bacterial counts from total bacterial counts in cooled raw milk. **International Journal of Food Science and Technology** 23(4); 1988; 379-383

Cooled raw bulk milk samples were examined for total bacterial count after 3 days at 30 C, and the numbers of psychrotrophs and proteolytic psychrotrophs after 10 days at 7 C. Positive correlations were found between the total bacterial count and the numbers of psychrotrophs, enumerated on standard plate count (SPC) agar (r = 0.88, n = 65), and between the numbers of psychrotrophs counted on SPC agar and on milk agar, resp. (r = 0.89, n = 59). Only 30.4% of the bacteria were psychrotrophs but the regression shows that the percentage of psychrotrophs increase when the total bacterial count rises. On average only small differences were found between the counts of psychrotrophs on SPC agar and milk agar, suggesting that in most samples the same organisms were probably enumerated on both media. The number of proteolytic bacteria were less well correlated with the numbers of psychrotrophs (r = 0.65, n = 56), as wide variations occurred between the samples. It is suggested that the total bacterial count at 30 C can be a useful estimate of the number of psychrotrophs. AS

938 Sindhu (JS) and Singh (S). Effect of pH on the heat stability of bovine milk from Zebu and crossbred cattle. Journal of Food Processing and Preservation 12(1); 1988; 11-25

In this investigation the effect of cross breeding of Zebu cattle with the animals of exotic breeds in order to improve the milk yield as adopted in Indian and Asian countries on the HCT/pH of milk has been studied. This will help to produce more milk of better stability and in this connection the effect of pH on the heat stability of milk from two cross breeds was also investigated. The results revealed that the majority of individual animals and all the bulk milks from these animals were found to be Type A and most of the Type A milks from individual animals and all the samples of bulk milk were most stable at acidic pH or at the natural pH indicating the unsuitability of common stabilisers during processing. It was also seen that by selective cross breeding it was found possible to produce milk with a desired HCT/pH profile and better stability. NGKR

939 Walker (SJ). Major spoilage microorganisms in milk and dairy products. Journal of the Society of Dairy Technology 41(4); 1988; 91-92

This paper relates to the types of most common spoilage microorganisms of milk and dairy products such as those of gram-negative rod shaped bacteria (e.g. Pseudomonas spp., coliforms), Gram-positive spore forming bacteria (e.g. Bacillus spp. Clostridium spp), lactic acid producing bacteria (e.g. Streptococcus spp.) and yeasts and molds. The spoilage changes brought about by these organisms in milk and dairy products are also discussed. MCV

Milk products

940 Brant (DL). Fresh chilled dairy products. Journal of the Society of Dairy Technology 41(4); 1988; 92-93

Yoghurt, an important fermented dairy product is discussed in relation to its definition, composition, processing and factors affecting quality. Besides, the paper also refer to other dairy desserts. MCV

941 Dominguez (L), Fernandez (JF). **Assessment of different selective agar media for enumeration and isolation Listeria from dairy products. Journal of Dairy Research** 55(4); 1988; 579-583

Different selective agar media were compared for the recovery and isolation of five sp. of **Listeria** from raw milk and cheese. The selective media examined were "Beerens medium, MacBride medium" and that described by Dominquez et al.(1984) with 6 mg/l acriflavine, **Listeria** selective agar medium (LSAM), and LSAM with 12 mg/l acriflavine (LSAM X 2A); a non-selective yeast glucose Lemco agar was included for comparison. When the difference between Listeria and the natural microflora of raw milk and cheese was 10^2 cfu/ml, **Listeria** could be isolated by direct plating on all media tested. When it was lower than 10^3 - 10^4 cfu/ml, listeria were isolated by direct plating only on LSAM and LSAM X 2A. When the difference was greater ;than 10^4 cfu/ml, a previous enrichment was necessary to isolate them. LSAM and LSAM X 2A media performed better than the other media tested for isolating **Listeria** by direct plating and improved their isolation for dairy products. This superior performance was evaluated by the ability of these media to support colony formation of different sp. of **Listeria** tested, the easy recognition of these colonies from those formed by other microorganisms and by their capacity to inhibit the natural microflora of these foods. AS

942 Moran (DPJ). Yellow fat spreads. **Journal of the Society of Dairy Technology** 41(3); 1988; 63-64

The paper relates to the radical changes undergoing in the market for spreading products. Invariably, butter and margarine account for nearly 70% of volume shares. However, there is a shift to reduced fat intake and therefore to spreads to fulfill such demands is increasing. The market for more novel spreads appears very promising. As consumers switch from 80% fat products, alternative spreads with good qualities and reliable functional properties but with reduced fat content can offer benefits of convenience, health, improved taste and from the manufacturer's point of view, lower raw material costs. MCV

Butter

943 Uhler (AD) and Miller (LJ). Multiple headspace extraction gas chromatography for the determination of volatile halocarbon compounds in butter. **Journal of Agricultural and Food Chemistry** 36(4); 1988; 772-775

Multiple headspace extraction gas chromatography (MHEGC) is a discontinuous gas extraction technique that provides straight forward, rapid quantitation of volatile compounds from a wide var. of matrices. In this paper, the theory of MHE is summarized and an MHEGC procedure for the determination of volatile halocarbons (VHCs) in butter is described. Detection limits and quantitation limits, resp. for six VHCs in butter were as follows (p.p.b); chloroform, 2, 10; 1, 1,1-trichloroethylene, 3, 10; carbon tetrachloride, 1, 5; trichloroethylene, 5, 15; bromodichloromethane, 3, 13; tetrachloroethylene, 2.5. Over the concn. range 40-1500 p.p.b., average recovery . and standard deviation) for the six VHCs was 95 plus or minus 3.2%. AS

Cheese

944 Blond (G), Haury (E) and Lorient (D). Effect of batch and extrusion cooking on lipids-proteins interactions of processed cheese. **Sciences des Aliments** 8(3); 1988; 325-340

Processed cheese is prepared by batch and by extrusion cooking. The cheese mix contains varying amounts of polyphosphates, ions, previously processed cheese and lipids. The extrusion conditions (barret temp., screw speed) are also varied. The emulsion stability of batch and extrusion processed cheeses was evaluated using Protein Peptisation and stability Index r. The degree of peptisation was calculated as the (NSN-NCN) over (NT-NCN) ratio. Batch processed cheeses displayed a firmer texture with lower degrees of peptisation than extrusion processed cheeses of identical composition; this difference corresponds to an improved protein restructuring or gelation. It probably reflects the fact that the mechanical stirring is better and the temp. higher during extrusion cooking. When the lipid content of the cheese mix increases from 40 to 60%, through the addition of butter, the degree of peptisation of batch and extrusion processed cheeses is increased and the creaming step becomes less effective. This may indicate that a high lipid content restricts the formation of a restructured protein network; thus the degree of peptisation is not the only criteria for the emulsion stability. A new index is proposed to evaluate protein-lipid binding: stability index: r = MGS/NSN. MGS is lipid fraction bound to non sedimentable nitrogen (NSN), measured in the ultracentrifugation supernatant. The higher this ratio the more stable is the emulsion. AS

945 Cantoni (C), Comi (G) and Valenti (M). Incidence of **L. monocytogenes** in cheese. **Industrie Alimentari** 27(258); 1988; 266-268 (It).

Data about the listeria incidence in Italian and some foreign cheeses have been furnished. AS

946 Comi (G) and Cantoni (C). Some aspects of **L. monocytogenes** in cheeses. **Industrie Alimentari** 27(257); 1988; 104-105, 108 (It).

In this work, a design strategy for continuous multistage hyperfiltration units was established so as to choose the more appropriate configuration (i.e., tubular, plate and frame, or spiral wound type) and the corresponding operating conditions associated with minimum water removal costs. With specific reference to large scale production of semi conc. apple juices at Ca 20 C Brix, such a procedure showed that the operation of tubular membranes seems to be more remunerative than that of the other two types examined. Probably because the solution undergoing concn. flows inside the tubular membrane under turbulent flow conditions, that are responsible for greater values of the mean permeate flux. AS

947 Polychroniadou (A). A simple procedure using trinitrobenzenesulphonic acid for monitoring proteolysis in cheese. Journal of Dairy Research 55(4); 1988; 585-596

A simple, rapid and sensitive spectrophotometric assay was developed and evaluated for monitoring proteolysis during cheese ripening, based on the fact that alpha-amino groups released by hydrolysis of cheese proteins react with trinitrobenzenesulphonic acid to form products that absorb strongly at 420 nm. A linear relationship was shown to exist between A_{420} and concn. of free alpha-amino groups up to 0.5 mM ($r = 0.999$, 38 df, $P < 0.001$). Repeatability of the method was satisfactory. The coeff. of variance was 0.53% for amino acid solutions and 1.19% for cheese extracts. Average recovery of glycine added to the cheese was 104 plus or minus 2.9%. A comparison of the above method with that of detn. of water soluble N to total N ratio showed that there was good agreement between these two methods of assessment of proteolysis in cheese ($r = 0.857$ 32 df, $P < 0.001$). Mainly Feta and Teleme cheese were examined, but a similar correlation was obtained with hard Greek cheeses. Analytical conditions of the procedure are discussed. AS

Cheddar cheese

948 Bautista (L) and Kroll (RG). Survival of some non-starter bacteria in naturally ripened and enzyme-accelerated cheddar cheese. Journal of Dairy Research 55(4); 1988; 597-602

Effects of the addition of proteinase (Neutrase 1-5S) and a peptidase (aminopeptidase DP-102) as agents for accelerating the ripening of Cheddar cheese on the survival of some non-starter bacteria (Staphylococcus aureus, Enterococcus faecalis, Escherichia coli and a Salmonella sp.) were studied throughout a 4-month ripening period. The enzymes were found to have no significant effect on the survival of the gram-positive bacteria but some significant effects were observed, at some stages of the ripening period, with the gram-negative bacteria in that lower levels were recovered from cheese treated with the enzyme system. AS

949 Reinbold (RS) and Ernstrom (CA). Effect of nonuniform cooling on moisture, salt, and pH distribution in 290 kilogram blocks of stirred-curd cheddar cheese. Journal of Dairy Science 71(6); 1988; 1499-1506

Cheese samples representing six positions in each of 12 290 kg stirred curd cheddar cheese blocks in stainless steel hoops were analyzed for salt, pH, and moisture after the blocks had been held at 6 or 22 C for 7 days after pressing. Analysis of variance was used to determine differences between vats, filling sequences, cooling treatments, and positions within cheese blocks. Temp. during cooling had a significant effect on pH, salt, and moisture distribution within the cheese. Mean differences between the centres and sides of all cheese blocks cooled at 5 C were .1% salt, .12 pH units, and 5.73% moisture. Differences between the centres and sides of cheese blocks cooled at 22 C were 0% slat, .03pH units, and .96% moisture. After filling the hoops, moisture transferred from high temp. to low temp. areas in the cheese. Moisture differences in large cheese blocks were minimized when temp. differences within blocks were reduced. AS

Ice cream

950 Miglani (N), Jain (SC) and Shukla (FC). A study on the development of highly nutritious filled ice cream by the use of freshly prepared sodium caseinate. **Beverage & Food World** 15(3); 1988; 30-34

Freshly prepared sodium caseinate in the form of slurry was used at three different levels in the preparation of partially filled ice cream. The milk fat content was replaced to the extent of 10% by vegetable oil viz. dalda, groundnut oil, cottonseed oil and safflower oil in order to prepare filled ice cream. Ice cream mixes were tested for protein, fat and total solids percentages and for viscosity, freezing time and whipping ability and the resulting ice-cream were analysed for overrun flavour body and texture and melting resistance. Freezing time remained almost unaffected by the incorporation of sodium caseinate. Whipping time was considerably decreased with the incorporation of sodium caseinate in the partially filled ice cream with the increase in the level of sodium caseinate, the melting resistance of ice-creams increased within experimental limits. Ice cream mixes when treated with sodium caseinate at more than 2% levels, exhibited max. relative viscosity values. It showed a little increase in overrun when treated with one to two percent levels of caseiante. With the sodium caseinate treatment upto 1 to 2% the texture of the partially filled ice cream was found to be improved but beyond 2% level the ice cream develop gumminess. Sodium caseinate being odourless and taste less did not affect the flavour of ice cream. AS

Khoa

951 Christie (IS) and Shah (CM). Feasibility studies on prototype of khoa making machine. **Beverage & Food World** 15(3); 1988; 15-16

A small model of khoa-making machine is presented here. The spring loaded scraper blades incorporated in this model, give very high rates of water evaporation and do away with the problems of fouling and burning. The khoa prepared by this machine is of excellent quality. 10kg. of milk can be converted into khoa in about 35 min at steam pressure of 2.0 kg/cm^2 . The machine is simple in construction and can easily be operated. The results obtained are very promising and could well lead to a modern khoa-making machine suitable for dairy industry. BV

Whey

952 Marwaha (SS) and Kennedy (JF). Whey-pollution problem and potential utilization. **International Journal of Food Science and Technology** 23(4); 1988; 323-336

This review discusses whey disposal and evaluates recent process developments for its improved utilisation and potential market acceptability for its products. It covers whey production the world scene, whey as a pollution problem, whey as a potential and conclusions. NGKR

953 Sciancalepore (V) and Longone (V). Plastein synthesis by the action of alpha-chymotrypsin on a peptic hydrolysate of whey protein. **Journal of Dairy Research** 55(4); 1988; 547-550

A peptic hydrolysate of proteinaceous material of whey from Mozzarella cheese manufacture was incubated with alpha-chymotrypsin under conditions leading to the formation of plastein products. The influence of incubation time, concn. and molecular size of substrate was studied. The most favourable conditions for the plastein synthesis were 12 h incubation time and 35%(w/v) concn. of peptides having mole. wt. in the range 451-1450. To determine the effects of the molecular size of the substrate on plastein formation, the peptic hydrolysate was filtered with Sephadex G-25 and separated into fractions I, II and III in the order of decreasing mol. wt. For plastein synthesis, the substrate is required to be of moderately low mol. wt. MCV

Yoghurts

954 Blanco (JL), Dominguez (L), Gomez-Lucia (E), Garayzabal (JFF), Goyache (J) and Suarez (G). Experimental aflatoxin production in commercial yoghurt. **Zeitschrift fur Lebensmittel-Untersuchung und -Forschung** 186(3); 1988; 218-222

The production of aflatoxins in commercial yoghurt inoculated with **Aspergillus parasiticus** NRRL 2999 was studied, using different incubation conditions. In all of the experiments, the level of aflatoxins was higher at 28 C than at 15 C and higher in a damaged container than in an "intact" container (related to microaerophilic conditions). No fungal growth or aflatoxin production was seen at 10 C. Both fungal growth and aflatoxin concn. vary throughout the incubation period instead of progressively increasing. The ratio of aflatoxin B and G (B:G) at 28 C was almost 1:1 but generally more aflatoxin G was detected at 15 C. The distribution in mycelium/substrate was approx. 1:1 at both 28 C and 15 C. AS

955 Ilic (DB) and Ashoor (SH). Stability of vitamins A and C fortified yoghurt. **Journal of Dairy Science** 71(6); 1988; 1492-1498

Vitamins A and C fortified in commercial yoghurt samples and stored at 3 C for 6 wks. A fortnightly analysis of pH, titrable acidity, vitamin A and C was carried out. HPLC was for the estimation of vitamins A and C. Data were analysed by statistical analysis system. The vitamins content in fortified yoghurt decreased during storage. However, the fortification levels of vitamin A 10,000 14 and vitamin C 300 mg per 227 of the yoghurt did not alter pH, titrable acidity or sensory characteristics. JSS

Milk proteins

956 Grufferty (MB) and Fox (PF). Milk alkaline proteinase. **Journal of Dairy Research** 55(4); 2199; 609-630

A review article on milk alkaline proteinase (MAP) with emphasis on distribution, isolation and properties of MAP, proteolysis of milk proteins by MAP, proteose peptones, heat stability of MAP, and significance of MAP proteolysis in dairy products. MCV

957 Hashizume (K) and Sato (T). Gel forming characteristics of milk proteins. 2. Journal of Dairy Science 71(6); 1988; 1447-1454

The gel-forming characteristics of milk proteins were investigated by employing skim milk either nonpreheated or preheated at 80 C, and coagulating them at 70 or 80 C with glucono-delta-lactone. The solubility of each gel in the phosphate buffer (pH 7.0) containing urea and 2-mercaptoethanol was examined. The disulphide bonds played a more important role in the gel coagulated at 80 C from skim milk preheated at 80 Degre C than in the gel coagulated at 70 C from nonpreheated skim milk. The effect of the reduction treatment with 2-mercaptoethanol was more pronounced on preheated skim milk than on nonpreheated skim milk. Sulphydryl groups and disulphide bonds, which were buried in the molecules of whey proteins in their native state, were rendered accessible following heat treatment at 80 C. The gel prepared from skim milk pretreated with oxidizing agent, hydrogen peroxide (i.e., skim milk has no accessible sulphydryl groups as a result), or the gel prepared from skim milk pretreated with reducing agent, 2-mercaptoethanol, (i.e., skim milk has few diculphide bonds as a result, displayed week gel formation. But the gel prepared from the mixture of these skim milks with appropriate ratio displayed higher gel firmness. These findings suggest that intermolecular disulphide bonds are formed by the exchanges. AS

958 Hashizume (K) and Sato (T). Gel-forming characteristics of milk proteins. 1. Effect of heat treatment. Journal of Dairy Science 71(6); 1988; 1439-1446

Skim milk with or without preheating (60 to 80 C for 30 min) were acid coagulated at 60 to 80 C for 1 h with glucono-delta-lactone. Preheating below 70 C has no effect on gel firmness and water-holding capacity. When coagualted below 70 C, the gels were weak and had low water-holding capacity. When coagualted at 80 C, the gels were solid and had high water-holding capacity. Gels prepared from skim milks preheated to above 80 C and different quality; when coagulated at less than 70 C, gel firmness increased slightly, and when coagulated at 80 C, gel firmness decreased sharply. Change in the accessibility of sulphydryl groups in milk protein caused by heating, was also measured using Ellman's reagent. Changes in the gel-forming property of milk protein, caused by the heat treatment, were closely related to increase in available sulfhydryl groups in milk proteins, and also were related to heat denaturation of whey protein or the formation of Beta-lactoglobulin/k-casein complex. AS

959 Manji (B) and Kakuda (Y). The role of protein denaturation, extent of proteolysis, and storage temperature on the mechanism of age gelation in a model system. Journal of Dairy Science 71(6); 1988; 1455-1463

A model system was used to investigate the effects of heat temp., storage temp., and proteolysis on the gelation time of both unconcentrated and concentrated (evaporated) milks. For unconcentrated milks, increasing levels of whey protein denaturation retarded the gelation process. Elevated storage temp. accelerated the gelation process, but only in cases when milk samples had been previously proteolyzed. The actual extent of proteolysis was not related to gelation time. In evaporated milk, increasing temp. and extent of proteolysis reduced gelation time. Samples that had no induced proteolysis also gelled. Age gelation in unconcentrated and concentrated milks is controlled by two different mechanisms. In unconcentrated milk, gelation is a two-stage process where proteolysis is followed by nonenzymatic physicochemical changes. In concentrated milk, gelation occurrs by nonenzymatic physicochemical processes. AS

MEAT AND POULTRY

Meat

960 Locatelli (DP), Galli (A) and Pastori (G). Spices influence on hygiene of wurstel, mortadella and ravioli, stuffed meat. **Industrie Alimentari** 27(258); 1988; 277-282 (It).

46 different samples of spices mixtures and related flavoured products, i.e. mortadella, wurstels and stuffed meat for ravioli, were studied in order to evaluate spices, influence on the hygiene of these foods. It has been noticed that the microbiological examination is not able to show spices influence with care on the contrary, filth test technique is much more exact. In fact the examined spices were rich in insect fragments and rodent hair which were found in the related manufactured products. Hygienic evaluation of food flavoured with spices should be performed methodically joining microbiological examination with filth test technique. AS

961 Rossi (M). Textured sunflower protein for use as a meat extender. **Lobensmittel-Wissenschaft und-Technologie** 21(5); 1988; 267-270

A defatted sunflower meal was textured by extrusion cooking. Removal of phenolics was achieved during dehydration of the extrudate carried out in hot water for 15 min with a solvent to solid ratio of 50:1. Rehydration reduces the chlorogenic acid content yielding a product of lighter colour. Ground-beef patties were prepared replacing 15%, 30% and 45% of their meal content with the rehydrated extrudate. Total wt. loss and release of fat during cooking of the patties were evaluated. Sunflower added pattis showed higher juice retention than that of the all beef reference sample. The texture of the patties was measured using the Ottawa texture measuring system (OTMS) food cell. Instrumental chewiness decreased with per cent substitution. Sensorial tests were also carried out concerning overall quality, colour and chewiness. As regards overall quality no significant difference was noted between the whole meal reference and the blended patties containing 15% and 30% rehydrated sunflower extrudate.

AS

962 Vittucci (V), Triani (A) and Archilei (R). Bioluminescebce as a possible rapid technique to assess the total superficial bacterial count in meat. **Industrie Alimentari** 27(258); 1988; 263-265 (It).

The Microbial ATP from meat samples was evaluated by means of a proper Luciferin-Luciferase substrate using a LUMAC/3M - M 2010 A biocounter. Good correlation coeff. with the total plate count were obtained. AS

Beef

963 Arganosa (FC) and Ockerman (HW). The influence of curing ingredients, packaging method and storage on the biochemical and sensory qualities and acceptability of a dried beef product. **Journal of Food Processing and Preservation** 12(1); 1988; 45-51

In this investigation development and evaluation of a stable more tender than earlier products produced from older animals which can be stored at higher temp. and humidity existing in tropical countries has been described and also the effect of nitrate, packaging method and storage time on the sensory characteristics, residual nitrite, TBA values and microbiological counts of dried beef produced by this method were also evaluated. A pressure cooking and accelerated drying technique has been used for the above process. The results showed that residual nitrite was significantly reduced in non vacuum compared to vacuum packaged samples and was reduced by storage time but was not influenced by addition of nitrate. TBA values were found to be not affected by nitrate vacuum packaging but increased significantly with storage time. The dried beef was found to be acceptable even after 6 wks storage with low total aerobic plate counts and without anaerobic bacteria. This technique facilitated a product without nitrate, and post cooking and vacuum packaging and this will be useful in high amibent temp. NGKR

Mutton

Goat

964 Sharma (N), Keshri (RC), Padda (GS) and Sharma (BD). Influence of hot boning on meat yield and physical characteristics of goat carcass. **Indian Journal of Animal Sciences** 5(9); 1988; 1122-1124

The report on quantitative differences in yield and changes associated with tenderness, cooking, volume and drip due to hot boning and cold boning of goat carcasses. AS

Pork

965 Cerri (D), Rindi (S), Renieri (G) and Gerardo (B). **Yersinia enterocolitica** in fresh pork sausages. **Industrie Alimentari** 27(258); 1988; 255-256 (It).

966 Yadava (R), Prasad (M) and Narayan (KG). Dynamics of contamination of prok with **Salmonella** in a pork processing plant. **Indian Journal of Animal Sciences** 58(6); 1988; 663-655

Products

Meat

967 Gains (N), Krazanowski (WJ) and Thomson (DMH). A comparison of variable reduction techniques in an attitudinal investigation of meat products. **Journal of Sensory Studies** 3(1); 1988; 37-48

In many attitudinal investigations, particularly those involving free-choice profiling, a very large list of variable or features can emerge. Ordination using generalized Procrustes analysis provides a common base for comparing assessors, but the derived configurations are often high-dimensional and difficult to summarize. This problem can be rectified by selecting a small subset of the original set of variables. Methods of variable selection in principal component analysis can be adapted easily for such purposes, but there is no guarantee with these methods that overall data structure is preserved. A recently introduced variable selection procedure that does aim to preserve the data structure as much as possible would seem to be more appropriate. All methods are described and applied to a set of data arising from an attitudinal investigation of meat products. The results indicate that variable selection should be more widely encouraged. AS

968 Plowman (JE) and Close (EA). An evaluation of a method to differentiate the sp. of origin of meat on the basis of contents of anserine, balenine, and carnosine in skeletal muscle. **Journal of the Science of Food and Agriculture** 45(1); 1988; 69-78

The high performance liquid chromatographic method proposed by Carnegie for determining the sp. of origin of meats in cooked products has been evaluated. The dipeptides anserine, balenine (ophidine) and carnosine have been extracted from the skeletal muscle of animals in New Zealand and compared with results obtained in Australia. The presence of significant quantities of balenine in red deer meat is reported for the first time. Limitations of the method are discussed. AS

Sausages

969 Medina (MB). Extraction and quantitation of soy protein in sausages by ELISA. **Journal of Agricultural and Food Chemistry** 36(4); 1988; 766-771

An indirect ELISA procedure was applied to detect and measure soy protein in sodium carbonate buffer extracts (pH 9.8) of cooked and uncooked sausages without prior delipidation of protein isolation. The method was evaluated on frankfurters prepared in our lab. containing 0, 1, 2, 3, 4, and 5% soy isolate. With food-grade soy isolate as standard, results showed that experimental values were 94% in agreement with all levels of added soy isolate and had 95% confidence limits of 80-107%. When the extraction and ELISA procedures were applied to 23 commercial samples, results were negative on 18 products with no soy additive label while flour lots of one product showed < 2.5% soy protein and another product had 2.6% (plus or minus 0.4, P < 0.05). This procedure provides a more simple, rapid, and direct analysis of soy additives suitable for monitoring adherence to the legal restrictions regarding use of soy protein additivies in processed meat products. AS

Poultry

Chickens

Broilers

970 Dawson (PL), Janky (DM), Dukes (MG), Thompson (LD) and Woodward (SA). Tenderness of hot-boned broiler breast fillets chilled in either water or brine using two different chilling regimens. **Poultry Science** 67(11); 1988; 1545-1548

Breast fillets were harvested from broiler carcasses at 5, 10 and 15 min post-mortem and chilled in either brine (5% sodium chloride) or tap water. Two chilling regimens were used; 30 min in ice slush(1 C) or 10 min in 20 Degree C chilling solution followed by 20 min in ice slush (1 C). Cooked fillets were evaluated for shear force, percentage moisture, and cooking loss. Post-mortem boning time did not affect differences in tenderness (shear force) of fillets and did not interact with either chilling medium or chilling regimen. Brine-chilling fillets produced significantly higher cooked yield and cooked meat moisture than water chilling. Temp. reduction of the brine-chill solution produced significantly lower shear values than constant temp. brine chilling or water chilling, however, chilling regimen had no effect on shear force or water retention when water alone was used as the chilling medium. AS

971 Froning (GW) and Uijttenboogaart (TG). Effect of post-mortem electrical stimulation on colour, texture, pH and cooking losses of hot and cold deboned chicken broiler breast meat. **Poultry Science** 67(11); 1988; 1536-1544

Chicken broilers were electrically stunned prior to bleeding and slaughtered in the processing plant at the Spelderholt Center. A non-stimulated (NS) control was used. Post-mortem intermittent electrical stimulation (ES) for 60 s was applied using 100 V immediately after bleeding. Birds were deboned from one breast half at various times (0 to 240 min) after evisceration. The remaining half was left attached to the carcass. Breast muscle pH was significantly lowered by ES compared with pH of control birds. There was an electrical stimulation x time interaction when measuring Warner Bratzler max. shear, slope, and work values. Electrical stimulation at 0 or 15 min. actually toughened the breast muscle, but ES significantly tenderized breast muscle deboned at 120 and 240 min, compared with the control. Breast muscles from ES carcasses were significantly darker in colour, with lower lightness (L) values when hot deboned at 60 min or earlier. Postmortem ES significantly increased redness (a) values at all deboning times except 30 min. Cooking losses and expressible moisture were significantly increased by ES. Hot deboning significantly decreased sarcomere length, but ES had no significant effect on sarcomere length. AS

972 Izat (AL), Gardner (FA), Denton (JH) and Golan (FA). Incidience and level of **Campylobactar jejuni** in broiler processing. **Poultry Science** 67(11); 1988; 1545-1547

The distribution and level of **Campylobacter** jejuni throughout broiler processing was evaluated. Six trails were conducted at three broiler processing plants to determine the occurrence of C. jejuni on commercial broilers as affected by specific processing functions. Counts were determined at specific sampling stations throughout the plants, and patterns of counts among sampling stations and plants were observed. Between 1, 00 and 5, 500 C. jejuni/1,000 cm^2 skin surface (represents half the skin surface area of one defeathered broiler) were found on birds entering the three plants. Increases in C. jejuni levels were associated with both the picking and evisceratio operations. Broiler carcasses ready for packaging contained approx. 50 organisms/1000 cm^2 Campylobacter jejuni was also recovered from gizzard samples, carcass and gizzard chill water, and swab samples taken out of selected equipment surfaces. AS

Poultry products

973 Demertzis (PG) and Kontominas (MG). Study of water sorption of egg powders by inverse gas chromatography. **Zeitschrift fur Lebensmittel-Untersuchung und -Forschung** 186(3); 1988; 213-217

Inverse gas chromatography was used to study the water sorption properties of two spray-dried egg powders as a function of water activity, temp. and food composition. A considerably higher water uptake was observed in the defatted egg powder than in the whole-egg powder. Sorption isotherms at different temp. were determined in order to obtain the thermodynamic parameters of sorption. The thermodynamic parameter values were less negative for the whole egg-powder than for the defatted powder The reduction in water-binding capacity in the whole-egg powder is explained by the masking of the sorption sites by the non-hygroscopic fat. Both the BET and Freundlich equations were applied to the sorption isotherms, and the BET monolayer as well as the sorptive capacity values were calculated. AS

SEAFOODS

Crabs

974 Nakyama (T), Hatae (K), Matsui (Y), Kanoh (S) and Niwa (E). Psychorheological approach to texture of material for imitation crab leg from creep/recovery measurements. **Bulletin of the Japanese Society of Scientific Fisheries** ('Nihon Suisan Gakkai-shi') 53(11); 1987; 2031-

2039 (Ja).

Texture of material for imitation crab leg was characterized by creep/recovery behavior, and the relationship between sensory response and rheological property was discussed psychorheologically. The creep/recovery measurements were carried out on compression type parallel-plate viscoelastometer. The constant stress was applied for 300 s to determine the creep, and the stress was removed to determine the recovery for additional 300 s. The creep data were fitted to creep equation by regression analysis, and the theoretical recovery curve was predicted from the creep response. The requisites to material for imitation crab leg were great jelly strength in plunger penetration test and large strain in creep measurement. Material for imitation crab leg (high grade) exhibited small Young's modulus of Hookean body, small Young's moduli of Voigt body and small viscosities of Voigt body. It also exhibited medium (moderate) retardation times and moderately large viscosity of Newtonian body. Since the strain was extremely large in creep behavior, perfect creep recovery was not oberved due to the slight destruction of network structure. In sensory evaluation, the requisites to material for imitation crab leg were large sense intensity of jelly strength and high degree of softness. There was reasonable agreement between sensory evaluation result and instrumental/rheological data. AS

975 Prasad (PN) and Nellakantan (B). Chemical composition of the edible crab, **Scylla serrata**. **Beverage & Food World** 15(3); 1988; 37-38

Chemical analysis of **S. serrata** muscle meat indicated a higher protein and lower fat values in 51-80 mm size range. In sub-adult and adult crabs (81-130 mm carapace width), a consistent protein and decreased/glycogen and fat content was observed. The percentage of moisture was more in juveniles and sub-adults than that of adult crabs. AS

Fish

976 Davies (JR), Bardsley (RG), Ledward (DA) and Poulter (RG). Myosin thermal stability in fish muscle. **Journal of the Science of Food and Agriculture** 45(1); 1988; 61-68

The thermal stability of fish muscle proteins varies between sp. with considerable implications for storage and processing properties. Myosins were isolated from cod and snapper, cold and tropical water fish resp. and their thermal melting characteristics were compared using differential scanning calorimetry over a range of pH and ionic strength conditions. UJSPR

977 Koizumi (C), Wada (S) and Ohshima (T). Factors affecting development of rancid off odour in cooked fish meats during storage at 5 C. **Bulletin of the Japanese Society of Scientific Fisheries ('Nihon Suisan Gakkai-shi')** 53(11); 1987; 2003-2009 (Ja).

Investigations on factors affecting development of rancidity in cooked fish during storage at 5 C have been carried out. Rate of lipid oxidation of the meat of several sp. of fish was compared using TBA test; influence of water-extract of fish meat on the lipid oxidation was examined. Rate of increase in TBA values of cooked white muscles of fish sp. examined was in the following order. saucy 〉 mackerel 〉 sardine 〉 horse mackerel 〉 flying fish 〉 sable fish 〉 halibut 〉 dusky sole. White meat sp. such as sable fish, halibut and dusky sole were essentially not susceptible to rancidity. The susceptibility of white muscle of mackerel to rancidity was remarkably reduced by repeated extractions with water prior to cooking. Further, the dialysed water extract of mackerel meat had higher activity to cause rancidity of water-extracted mackerel meat than the diffused solution. Hence pigment in the fish muscle was suspected to be a major, catalyst for the development of rancidity in cooked and stored meat. SGB

978 Leblanc (EL), Leblanc (RJ) and Ervin (DM). Comparison of three methods of formaldehyde determination on frozen sole, pollock, haddock, and cod fillets. Journal of Food Biochemistry 12(2); 1988; 79-95

The Merchoquant test strip and a rapid, enzymatic method were evaluated for the quantitation of formaldehyde (HCHO) in neutralized perchloric acid extracts of fish muscle. Compared with the standard colorimetric Cochin and Axelrod (1959) modification of the Nash reagent method (1953), the nonglutathione dependent formaldehyde dehydrogenase (EC 1.2.1.46) method based on that of Yasuhara et al. (1982) for cratine was faster and less affected by interferences. The enzyme method resulted in lower HCHO values than did the modified Nash method for the gadoid pollock, haddock and cod samples while the semiquantitative Merchoquant test strip resulted in positive readings for only one cod sample. Seventy-nine perchloric acid fish extracts analyzed by the enzyme and modified Nash procedures showed a sp. dependent correlation between the two methods, with slopes of 0.847, 0.321, 0.436, 0.519 for sole, pollock, haddock and cod, resp. The HCHO content of the samples ranged between 0.4 and 75 μ moles%. Standard addition evaluation of the accuracy of the formaldehyde dehydrogenase method compared with the modified Nash procedure on three samples also resulted in sp. dependent slopes. Non gadoid sole samples showed the greatest deviation while cod was the only sp. where the modified Nash method resulted in HCHO values lower than those attained with the enzyme method. The detection limit of the formaldehyde dehydrogenase method was 0.3 μ moles%. AS

979 Nishimoto (S), Hashimoto (A), Seki (N) and Arai (K). Setting of mixed salted meat paste of two fish sp. in relation to cross-linking reaction of myosin heavy chain. Bulletin of the Japanese Society of Scientific Fisheries ('Nihon Suisan Gakkai-shi') 54(7); 1988; 1227-1235 (Ja).

Surimi of Alaska pollack was mixed with mince of chum salmon at various ratios. The surimi, mince, and their mixture were ground with 2.5% NaCl and incubated at 25 C or 40 C to induce the setting (SUWARI). Changes in gel texture (breaking strength and breaking strain) and protein subunits composition in the gel during incubation were investigated. Increase in breaking strength was observed in paste from Alaska pollack which occurred readily along with the formation of cross linked myosin heavy chain ($(HC)_n$); the paste from chum salmon hardly had increased breaking strength and $(HC)_n$ In the case of mixed paste of two different fish, the increase in breaking strength and the formation of $(HC)_n$ proceeded in an intermediate rate and extent between those of individual paste. The findings indicated that there was no accelerating factor for formation of cross-linking of HC and for gel formation in the paste of Alaska pollack, or for inhibiting the same reactions in the paste of chum salmon. SGB

980 Paredes (MDC) and Baker (RC). Physical, chemical and sensory changes during thermal processing of three species of canned fish. **Journal of Food Processing and Preservation** 12(1); 1988; 71-81

This investigation was carried out to determine the effect of species and formulation on the physical, chemical and sensory characteristics of catfish, ocean perch and Atlantic pollock during thermal processing. Differences in changes in pH, thiamin, texture and colour values during canning were seen between species but no significant differences in the changes in cookout volume, expressible moisture and TBA values were seen between sp. The formulation had no effect on the physical, chemical and sensory properties and the three canned sp.s were judged to be having appetizing colour, flavour and moderate in fish aroma, tenderness, juiciness and overall acceptability. NGKR

981 Reece (P). Recovery of proteases from fish waste. **Process Biochemistry** 23(3); 1988; 62-66

A lab. scale process suitable for the large-scale recovery of proteolytic enzymes from fish viscera silage is described. Procedures have been developed for isolating both acidic and alkaline proteases from salmon viscera and acidic proteases from cod and mackerel viscera using centrifugation, polyacrylic acid and ammonium sulphate precipitation, ultrafiltration and batch ion-exchange chromatography. The acidic proteases show optimum activity against haemoglobin at pH 2.6, are inactivated above pH 6.0, and are inhibited by pepstatin. The alkaline protease from salmon shows optimum activity against casein at pH 8.5 and is partially inhibited by phenylmethane sulphonyl fluoride and soybean trypsin inhibitor. AS

982 Saheki (K) and Kawanish (T). **Salmonella** contamination of fish meals prepared in the coastal areas of Japan. **Bulletin of the Japanese Society of Scientific Fisheries ('Nihon Suisan Gakkai-shi')** 54(7); 1988; 1189-1194 (Ja).

A survey was conducted on the contamination of fish meals with Salmonella in Japan. Samples belonging to the so-called coastal fish meals were collected from three fish meal factories located in Choshi, Chiba prefecture. Samples were collected once in a month from October 1981 to December 1982. The results can be summarised as follows (1) 26 samples out of 112 were positive qualitatively, and MPN of Salmonella in 17 of them ranged from 2 to 170 cells/100 g; (2) Total viable counts in these **Salmonella** positive samples ranged from 1.3 x 10^3 to 1.4 x 10^6 cells/g those of coliforms from 0 to 6.7^5 x 10^5

cells/g and those of fungi from 0 to 2.7 x 10^5 cells/g resp. (3) Out of the 416 **Salmonella** isolates, 354 wer identified as 10 serovars, including **S. cerro** (21%) **S. senstenberg** (H2S-ve) (15%) **S. anatum** (15%) and **S. havana** (12%). (4) The contamination of **Salmonella** occurred mainly after the preparation, especially during and after cooling step in the production. The results mentioned above strongly indicate the necessity for promoting sanitary control in the production of coastal fish meals in Japan. SGB

983 Sugahara (I), Kimura (T), Hayashi (K) and Tahara (T). Bacterial flora and effect of lytic enzyme on bacterial growth in mackerel muscle during storage. **Bulletin of the Japanese Society of Scientific Fisheries ('Nihon Suisan Gakkai-shi')** 54(7); 1988; 1195-1198

Bacterial flora in the mackerel muscle homogenates during storage at different temp. was investigated, and an attempt to apply lytic enzyme as a food preservative was made. **Pseudomonas** (32.3%), **Vibrio** (26.3%) and **Corynebacterium** (12.1%) predominated in the mackerel muscle homogenate. The number of bacteria in the mackerel homogenate stored at 20 C increased rapidly and reached max. value of about 10^9 cfu/g (wet wt.) of muscle after 12h. Strains belonging to the genus **Vibrio** were the only bacteria isolated from the mackerel homogenate stored at 20 C for 12h. The bacterial population in the mackerel homogenate did not increase during storage at 0 C for 3 days or at - 20 C for 60 days. **Pseudomonas** (41.5%) was the most dominant genus at 0 C after 24 h storage, while **Moraxella** (38.8%) and **Pseudomonas** (30.0%) predominated at -20 C after 60 days storage. The bacterial number in the mackerel homogenate gradually increased at 20 C after a lag phase of about 6 h upon addition of lytic enzyme. Lytic enzyme produced by **Bacillus** sp. V 37 seems to suppress bacterial growth at 20 C for at least 12 h. However, the preservative effect of lytic enzyme retarded after 24 h storage at 20 C. AS

984 Yoshioko (K) and Kitamikado (M). Differentiation of freeze-thawed fish fillet from fresh fish fillet by the examination of erythrocyte. Bulletin of the Japanese Society of Scientific Fisheries ('Nihon Suisan Gakkai-shi') 54(7); 1988; 1221-1225 (Ja).

A method for differentiation between fresh and frozen-thawed fillets was worked out using trace amounts of blood and dark muscle from the fillets. The differentiation was accomplished by recognising or not intact erythrocytes in them. A large number of fresh, refrigerated and frozen-thawed fillet samples were prepared from red sea bream and pacific mackerel. 20 µ l or less vol. of blood withdrawn from the ventral or dorsal aorta of the samples was smeared on a slide glass, dried and examined microscopically for the presence of intact erythrocytes after staining with Giensa solution a small amount of surface dark muscle taken from the samples was also examined similarly. Intact erythrocytes were recognised in the blood and dark muscles from fresh and refrigerated samples but not in the dark frozen-thawed samples. The erythrocytes were destroyed in the frozen-thawed samples. Commercial fillets of flat fish, hair tail and red horse head, and flesh block of tuna could be successfully examined, and fresh fillet and fresh block could be differentiated from frozen-thawed. SGB

Capelin

985 Aksnes (A) and Brekken (B). Tissue degradation, amino acid liberation and bacterial decomposition of bulk stored capelin. Journal of the Science of Food and Agriculture 45(1); 1988; 53-60

Bulk stored capelin with high contents of feed in the gut is easily solubilised because of high proteolytic activity. The amino acids most quickly liberated are arginine, serine, histidine, leucine, lysine and tyrosine, glycine, aspartic acid and glutamic acid are liberated at a slower rate. Bacterial activity results in a rapid and considerable decrease in total amounts of tyrosine, lysine, serine, arginine and histidine. The main products formed by bacterial decomposition of lysine, histidine and arginine are cadaverine, histamine and putrescine, resp. Storage of capelin in the presence of antibiotics increased the amounts of free amino acids and total amino acids. After 10 days storage at 6 C, about 30% of the total amino acid content in fish treated with antibiotics were free amino acids. AS

Pollack

986 Nishirnoto (S-I), Hashimoto (A), Sek (N), Kimura (I), Toyoda (K), Fujita (T) and Arai (K). Influencing factors on changes in myosin heavy chain and jelly strength of salted meat paste from Alaska pollack during setting. Bulletin of the Japanese Society of Scientific Fisheries ('Nihon Suisan Gakkai-shi') 53(11); 1987; 2011-2020 (Ja).

The frozen surimi of Alaska pollack was ground with NaCl and the salted meat paste was submitted to setting. When the setting proceeded, the decrease in myosin heavy chain (MHC) and the increase in jelly strength of the paste were investigated as a function of protein content, NaCl concn., pH, and temp. From the time courses, the rate (V_1) and extent (e_1) of decreasing MHC and those (V_2 and e_2) of increasing jelly strength were evaluated. As the decrease in MHC was accompanied by the formation of its polymer, the decreasing ability was presumed to manifest a cross-linking ability of MHC. On the other hand the increasing ability of jelly strength showed a gel-forming ability of the sources. It was thus found that there is a positive correlation between the cross-linking ability of MHC (expressed as V_1 e_1) and the gel-forming ability (expressed as V_2 e_2) of the salted meat/paste. As the protein content increases in the paste, the abilities given by V_1 e_1 and V_2 e_2 were both largely enhanced. At a fixed protein content, the same abilities ($V_1 \cdot e_1$ and $V_2 \cdot e_2$) were largest when NaCl concn was at 0.5 M, pH at 7.0 and temp. at 25 C. AS

Salmon

987 Shirai (T), Fuke (S), Yamaguchi (K) and Konosu (S). Nucleotides, quaternary ammonium bases, and related compounds in the raw and heated muscles of salmon. Bulletin of the Japanese Society of Scientific Fisheries ('Nihon Suisan Gakkai-shi') 54(7); 1988; 1199-1207

Contents of nucleotides and related compounds, TMAO, TMA, and glycine, betaine in the 80% ethanol extracts from the raw and heated muscles of salmon were measured and compared. Perchloric acid extracts, were also used for the measurement of nucleotides and related compounds. IMP, inosine, hypoxanthine, and TMAO were dominant in the raw muscle. Glycinebetaine was detected in relatively large amounts in several samples. TMAO was found in larger amounts in the caudal muscle. After heating the muscle, small amounts of IMP and TMAO were decreased, forming almost equivalent amounts of inosine + hypoxanthine and TMA, resp. The total nitrogens of the compounds analyzed for each samples accounted for more than 90% of the extractive nitrogen in this series of studies. AS

Sardines

988 Nakayama (T), Ichikawa (T), Kanoh (S) and Niwa (E). Manufacturing of restructured sardine meat by the aid of dialysis. **Bulletin of the Japanese Society of Scientific Fisheries** ('Nihon Suisan Gakkai-shi') 53(11); 1987; 2021-2030

Restructured sardine meat was produced from the mixture of sardine mince and sodium alginate by dialysing against calcium chloride solution. Comparing raw and cooked products from May-sardine-round (lipid 9.8%), the jelly strength did not increase and the breaking deformation was slightly decreased by the cooking process. This could be attributed to the protein denaturation induced during the frozen-storage of sardine at -20 C for 2 months. Comparing raw and cooked products from November-sardine-dress (lipid 16.6%) the jelly strength did not increase and the breaking deformation was slightly decreased by the cooking process. These effects could be due to high lipid content in November-sardine-dress. Comparing raw and cooked products from December-sardine-round (lipid 11.6%) and December-sardine-dress (lipid 10.4%), the jelly strength increased twice or more by the cooking process. However, upon cooking, the breaking deformation clearly increased in the case of round-product, but it remained unchanged in the case of dress-product. These results suggest that the proteins were preserved in the native state when sardine was forzen-stored at -40 C upto 1 month. The cooked product from December-sardine-round possessed the most favourable texture with a juicy taste. SGB

989 Perez Won (M), Iyama (S), Shinohara (K), Murakami (H) and Omura (H). A circular dichroism study of the effect of some organic solvents on the actomyosin of sardine (Sardinops melanosticta). **International Journal of Food Science and Technology** 23(4); 1988; 403-409

Circular dichroism (CD) was used to study changes in confromation of sardine (**Sardinops melanosticta**) actomyosin after treatment with some organic solvents. Untreated sardine actomyosin showed two negative bands at 208 and 222 nm, typical or proteins possessing alpha-helix configurations. The water-miscible alcohols methanol, ethanol, isopropanol and n-butanol, and the water-immiscible solvents n-hexane, n-octanol, and dichloromethane altered the native confromation of sardine actomyosin. The degree of alteration of native sardine actomyosin was principally dependent on the alcohol concn. and temp. used for dewatering. The least damage occurred with isopropanol, or with 10 or 90% aqueous ethanol; most damage occurred with 40-50% aqueous ethanol. Dichloromethane and n-butanol increased the alpha-helical content of the native protein. Treatment with hydrophilic and hydrophobic solvents at 70 and 20 C unfolded the protein to from a random coil, but defatting treatment at 2 C caused little damage. AS

Scampi

990 Allan Bremner (H). Chill-storage trials on three species of scampi. **Lebensmittel-Wissenschaft und-Technologie 21(5); 1988; 275-283**

Three species of scampi **Metanephrops andamanicus, M. boschmai** and **M. australiensis** were, frozen at sea in two forms: as whole animals and as scampi tails. After thawing they were stored at a temp. of 4 C for up to eight days, and evaluated by chemical, microbial and sensory methods. Neither the microbial flora nor the rate of nucleotide breakdown were different in the two forms, but the whole scampi exhibited greater discoloration and more marked deterioration of texture, possibly due to enzymes from the digestive gland. Although characteristic odours and flavours decreased and off-odours and off-flavours increased during storage, the tails remained as acceptable to a taste panel after 8 days storage as they were when just thawed. Whole scampi deteriorated but remained acceptable even at the end of the storage period. AS

991 Bremner (HA). Frozen storage trials on three species of scampi. **Lebensmittel-Wissenschaft und-Technologie 21(5); 1988; 284-287**

Three sp. of scampi **Metanephrops andamanicus, M. boschmai** and **M. australiensis**, were frozen on board soon after catching. These samples, either whole animals or tails, were evaluated after 2, 6 and 12 months frozen storage at a temp. of -18 C. The proteins denatured slowly, as indicated by slight decreases in saline extractable protein. The K-value decreased slightly, as did the total nucleotide pool. The textural changes were slight, but there was some loss of characteristic odours and flavours, and both off-odours and off-flavours increased. Acceptability was significantly lower after 12 months, storage than after 6 months, although the scampi remained generally high in acceptability. Scampi tails were more stable in storage than whole scampi, which are, however, a relatively stable seafood in frozen storage. AS

Trouts

992 Cortesti (ML), Rizzo (AM), Bochicchio (M) and Sarli (TA). **Residues of inhibitory substances in the muscular tissue of trouts of the market. Industrie Alimentari 27(258); 1988; 257-259, 262 (It).**

Residues of inhibitory substances, following the EEC-four-plate-method, and the method suggested by Tao et al. (1985) to detect flumequine residues, were researched in the muscolar tissue of n. 154 trouts bought in farms and in retail shops of central and southern Italy. Inhibitory substances were found in n. 28 trouts. Three of them were positive when examined with the first method, the remaining with the latter. AS

Mussels

993 Preun (J), Kolloch (M) and Kutscher (U). A simple method for the routine checking of mussels and shellfish products with regard to saxitoxin, using HPLC with fluorescence detection. **Deutsche Lebensmittel-Rundschau** 84(4); 1988; 114-116 (De).

A procedure for routine toxin analysis of shell fish products (paralytic shellfish poison. PSP) is described. Extracts are subjected to an alkaline hydrogenperoxide oxidation and without any cleaning up analyzed by HPLC with fluorimetric detection. Negative findings are established fast, securely and at minor expense. Positive findings are veryfied by cleaning up, chromatograp[C (HPLC, TLC), fluorimetric and/or bio assay. AS

Prawns

994 Furusho (S), Umezaki (Y), Ishida (K) and Honda (A). Changes in the concentration of ATP-related compounds and lactic acid in muscle of live prawn **Penaeus japonicus** during storage in sawdust. **Bulletin of the Japanese Society of Scientific Fisheries ('Nihon Suisan Gakkaishi')** 54(7); 1987; 1209-1212 (Ja).

Changes in the levels of ATP-related compounds and lactic acid in the muscle of live prawn **Penaeus japonicus** kept in the sawdust at 15 C were investigated to find an index suitable for evaluation of prawn activity during the transportation in the sawdust. The concn. of ATP in the muscle markedly decreased after storage of 48h, resulting in a rapid increase in the AMP level. The level of lactic acid in the muscle also gradually increased during storage in the sawdust. The ratio of ATP to the ATP-related compounds (the total nucleotides) in the muscle which closely related with the survival rate of prawn was found to be suitable as a criterion to evaluate the activity of prawn during transportation in the sawdust. The levels of the ATP-related compounds in the muscle of prawn kept in the sawdust recovered to their original levels within 1h after they were returned to the sea. AS

Squids

995 Synowiecki (J) and Sikorski (ZE). Heat induced changes in thiol groups in squid proteins. **Journal of Food Biochemistry** 12(2); 1988; 127-135

Products

Fish oils

996 Hsieh (TCY), Williams (SS), Vejaphan (W) and Meyers (SP). Characterization of volatile components of menhaden fish (**Brevoortia tyrannus**) oil. **Journal of the American Oil Chemists" Society** 66(1); 1989; 114-117

Volatile odor components of winterized and undeodorized menhaden (Brevoortia tyrannus) oil were characterized by dynamic headspace concn. on a porous polymer trap, thermal desorption, cryogenic focusing, high resolution gas chromatography, mass spectrometry and chromatography-coupled descriptive odor evaluation. Many volatile odor components derived from lipid oxidation in the fish oil were identified. These included, among other, short-chain saturated and unsaturated aldehydes and ketones, as well as short-chain carboxylic acids. The former imparted greasy, oily, oxidized oil and green grassy or green plant-like odors, and the latter gave rather objectionable sweaty odours. Normal alkanes were detected as major volatiles, without significant odors. The odor-significant volatile components may be used as specific flavour quality markers to determine deodorization efficiency of crude fish oil and to monitor flavour stability of purified oils. This combined analytical approach can be readily applied to the study of volatile components in other oils. AS

Kamaboko

997 Akahane (Y) and Shimizu (Y). Classification of the existing state of water in kamaboko by expressing, absorbing and thermogravimetric methods. **Bulletin of the Japanese Society of Scientific Fisheries ('Nihon Suisan Gakkai-shi')** 54(7); 1988; 1237-1241

The existing state of water in kamaboko was investigated by expressing, absorbing, and thermogravimetric methods. Kamaboko specimens were presented, between filter papers, at 50 kg/cm^2 . Two break points were found on the curve, which represented the relation between the amount of the expressible water and expressing time. These results indicated that the existing state of water in kamaboko could be classified into three categories-types Ip, IIp and IIIp. Type Ip was squeezed out rapidly, type IIp slowly and type III hardly. Amounts of types Ip, IIp and IIIp water coincided roughly with those of It, IIt, and IIIt classified by thermogravimetry. Alternately, Kamaboko specimens sandwiched between absorbing papers were vacuum packed. One break point was found in the curve which represented the relation between the amount of absorbable water and absorbable time. Water was classified into two states, the type Ia absorbed to the paper easily and the IIa absorbed hardly. Amount of Ia was approx. with that of Ip, and that of IIa with that of IIp plus IIIp. The relative amounts of the Ip, IIp and IIIp on the dry base were found out for the three kinds of Kamaboko differing in the amount of added water. The amounts of IIp plus IIIp, of all Kamaboko were mostly the same; the amount of Ip increased markedly with the increase in the

added water. The type Ip, probably regarded as "bulk phase water" was thus considered to largely contribute to the texture or juiciness of **Kamaboko.** SGB

PROTEIN FOODS

Infant foods

998 Hischenhuber (C). High performance liquid chromatographic and thin-layer chromatographic determination of taurine in infant formulas. **Deutsche Lebensmittel-Rundschau** 84(4); 1988; 117-120 (De).

A simple high performance liquid chromatographic (HPLC) and a thin-layer chromatographic (TLC) method are described for the detn. of taurine in infant formulas. In the HPLC procedure an aqueous extract of the test portion is clarified and subjected to derivatization with dansyl chloride. After filtration the taurine derivative is determined by HPLC using a C-18 bonded silica gel column and a mixture of acetonitrile, tetrahydrofurane and an acetate buffer as a mobile phase. Detection is performed either by fluorometry or by spectrophotometry. In the proposed TLC method, the aqueous extract is clarified and cleaned up over an anionic ion exchange column and subjected to TLC. Taurine is determined by visual estimation of the spots revealed by ninhydrin reagent. Both methods were successfully applied to various infant formulas procedure was also found to be suitable for the detn. of naturally occuring taurine in breast milk, in whey and milk based products, as well as in infant formulas containing partially hydrolysed proteins. AS

ALCOHOLIC AND NON-ALCOHOLIC BEVERAGES

999 Zipfel (W). Production and declaration of wine-like and sparkling wine-like beverages. **Flussiges Obst** 55(11); 1988; 660-663 (De).

Alcoholic beverages

Beer

1000 Bilinski (CA), Emery (CH), Zygora (PS), Russell (I) and Stewart (GG). Application of extracellular yeast proteinases in beer stabilization. **CRC Critical Reviews in Biotechnology** 8(2); 1988; 111-120

An extensive screening operation was undertaken in an effort to identify yeast strains capable of extracellular acid proteinase production. Although two strains of **Saccharomyces cerevisiae** gave positive extracellular proteinase phenotypes in plate tests, it was not possible to demonstrate proteolytic activities in cell-free culture supernatants under the conditions employed. Of yeasts from other genera, **Saccharomycopsis fibuligera** and **Torulopsis magnoliae** produced extracellular proteinases with desirable properties. Proteolytic activities were detected in assays performed at beer pH values and low temp., Brewer's wort served as a highly inducing medium for extracellular proteinase production, with **T. magnoliae** giving the highest enzyme yields. In fact, commencement of enzyme production was detected shortly after the onset of growth in wort. Inclusion of crude enzyme preparations in wort pitched simultaneously with brewer's yeast reduced final ethanol yields slightly and was found to reduce haze without any objectionable effect on foam stability. AS

1001 Jackson (AP). Control of process time and beer quality in high gravity fermentations. **Technical Quarterly, Master Brewers' Association of the Americas** 25(3); 1988; 104-107

The requirement for greater throughput and even better utilization of plant to satisfy volume and cost requirements led to the adoption of high gravity brewing with reduced process times in Southern Africa. This necessitated a better understanding of the effects of some process control variables which could be used to assist in the prime objective and also to improve quality. The effects of wort oxygen level, with both upper and lower limits, the use of acid washing as a means of conditioning yeast activity, free amino nitrogen levels in wort and beer and the use of yeast food on the end result are presented. AS

Breweries

1002 Berkmortel (HAVD). Water desalination by reverse osmosis. **Technical Quarterly, Master Brewers' Association of the Americas** 25(4); 1988; 85-90

The article deals with the reverse osmosis separation methods followed by Heineken and Zoetewoude breweries in Holland, to desalinate the well water containing significantly higher levels of salts to make it suitable for use in brewing. Details of the plant, and unit operations involved are described. NGM

Malt

1003 Stoscheek (W). Malt conditioning and milling with todays modern equipment. **Technical Quarterly, Master Brewers' Association of the Americas** 25(3); 1988; 108-111

The paper describes the benefecial effect of moist conditioning of malt prior to milling on the reduced pulverisibility of husk, improvement in lautering time; water sprayed on the cleaned malt at a constant pressure, so that the moisture content increases by 1.5-2.0%, mixed and conditioned for 1.5-2.0 min. This enhances the pure husk volume by 50-70% after milling and spent grain volume in the lauter two by 20% and at the same time reduces the lautering time by 30 min. NGM

Wines

1004 Etievant (P), Schlich (P), Bouvier (JC), Symonds (P) and Bertrand (A). Varietal and geographic classification of French red wines in terms of elements, amino acids and aromatic alcohols. **Journal of the Science of Food and Agriculture** 45(1); 1988; 25-41

Thirty four French red wines from three regions already studied for their anthocyanin and flavonoid constituents have been further analyzed for elements, amino acids, and aromatic alcohols. An interpretation of the differences between wines related to their different geographic and varietal origins has been made from the results of statistical analysis. UJSPR.

1005 Heredia (FJ) and Guzman (M). Application of chromatic parameters to follow time-dependent spoilage of wines. **Acta Alimentaria** 17(2); 1988; 103-111

Time elapsed before the chromatic analysis is undertaken has an outstanding influence on the colour of red wines. To examine this influence several chromatic systems have been applied to four sets of red and rose Andalusian wines. Methods from the O.I.V (Office Internationale de la Vigne et du Vin) and Colour Spaces recommended by the C.I.E. (Commission Internationale de I'Eclairange) were used. Saturation appears to be the most useful chromatic parameter to assess the préservation status of red wines. AS

1006 Ough (CS), Crowell (EA), Kunkee (RE), Vilas (MR) and Lagier (S). A study of histamine production by various wine bacteria in model solutions and in wine. **Journal of Food Processing and Preservation** 12(1); 1988; 63-70

1007 Salvador (MD), Izquierdo (L), Nadal (MI) and Perez (R). Dealcoholization of wine by flash evaporation. **Revista de Agroquimica y Tecnologia de Alimentos** 28(2); 1988; 261-273 (Es).

Factors affecting the dealcoholization of wines by flash evaporation were studied using model solutions and wine samples. A high correlation coeff. (0.991) was found between evaporation rate and alcoholic content of the obtained product what allowed an accurate predication of the evaporation rate necessary to obtain, from any raw material, products with the desired alcoholic content. Flavour acceptance strongly depended on evaporation temp. The best results were obtained at temp. ranging from 50 to 70 C, whereas thermal damage was observed at 90 C and loss of volatiles at 35 C. AS

Non-alcoholic beverages

Coffee

1008 Schonbrun (KM). New generation scavenger system adds freshness enhancement and extended shelf life. **Tea and Coffee Trade Journal** 160(9); 1988; 42-44

This review covers various aspects of a New generation scavenger system which adds freshness enhancement and extended shelf life. Also covers the problems in retaining coffee freshness and other developments. NGKR

1009 Sivetz (M). Examining the degree of roast. **Tea and Coffee Trade Journal** 160(9); 1988; 14-16

In this paper the relationship between the degree of roasting of coffee beans and the physicochemical changes in the roasted coffee beans has been discussed. The degree of roast can be defined in terms of finishing roasting temp., raosting loss and the roasted bean colour which can be measured on various reflectance meters with roasted coffee powders. The different roasts have been described as light, medium heavy and dark with different finishing roasting temp. ranging between 430 to 475 F roasting characteristics and cup quality as desired by the consumers. NGKR

Fruit juices

1010 Beck (H). Variety in juice filtration technology - which technology is significant for us. **Flussiges Obst** 55(11); 1988; 657-658 (De).

1011 Buchwald (B). Free-flow pasteurization of fruit juice drinks. **Flussiges Obst** 55(11); 1988; 652-656 (De).

Apple juices

1012 Dietrich (H) and Schopplein (H). Examination of a secondary haze in amylase-treated apple juices and wines (filamentous precipitation). **Flussiges Obst** 55(11); 1988; 630-644 (De).

1013 Durr (P), Schobinger (U) and Waldvogel (R). Tests with ziconium oxide membranes in connection with the problem of haze formation of ultrafiltered apple juices. **Flussiges Obst** 55(11); 1988; 621-624, (640-641) (De).

1014 Schobinger (U). Possibilities and limits of ultrafiltration for the clarification of apple juice. **Flussiges Obst** 55(11); 1988; 614-629 (639-640) (De).

Tea

1015 Lee (S). Flavour protection by packaging. **Tea and Coffee Trade Journal** 160(9); 1988; 3-4

The importance of packaging for decorative and protective purpose in tea and coffee products has been discussed in this paper. Various new films tested were based on the standard polypropylene resin-coated on one or both sides with acrylic polymers or polyvinylidene chloride (PVCD or Saran). Oxygen and water vapour transmission rates have been accurately measured as a function of time, temp. and film thickness for practically every sp. of polymer film used in packaging. Since odour and flavour components are complex and critical plastic packaging manufactures caution that each product enclosed in a polymer be throughly tested for long term stability before adoption. NGKR

1016 Seshadri (R) and Dhanaraj (N). New hydrophobic lipid interactions in tea cream. Journal of the Science of Food and Agriculture 45(1); 1988; 79-86

Tea cream, obtained by cooling tea infusions, has earlier been reported to be a complex between caffeine tea polyphenols and proteins. Now a lipid complex comprising components such as 1-triacontanol, alpha-spinasterol, dihydro alpha-spinasterol and others earlier reported in the tea plant have been isolated from tea cream and identified. Hydrophobic interactions between the lipids and other components of tea cream are envisaged. AS

1017 Szente (L), Gal-Fuzy (M) and Szejtli (J). Tea aromatization with beta-cyclodextrin complexed flavours. Acta Alimentaria 17(2); 1988; 193-199

Beta-cyclodextrin complexed bergamot, jasmine, peppermint, or cinnamon oils were added to Ceylon black tea of standard quality. On contacting with hot water the complexed volatile oils get released immediately. Comparative stability and sensory tests showed, that the use of beta-cyclodextrin entrapped flavouring materials for tea aromatizations resulted in products of remarkably improved stability, storability and sensory value. AS

FATS AND OILS

1018 Garti (N), Schlichter (J) and Sarig (S). DSC-studies concerning polymorphism of saturated monoacid triglycerides in the presence of food emulsifiers. FAT Science and Technology 90(8); 1988; 295-299

The polymorphism of saturated monoacid triglyceride like trilaurin, trimyristein, tripalmitin and tristearin in the presence of food emulsifiers like sorbitan monopalmitate, sorbitan monostearate, sorbitan tristearate, sorbitan monostearate etc. were investigated using the differential scaning calorimetry. deltaHf values of alpha and beta polymorphs in the presence and in the absence of emulsifiers were compared. N

1019 Thies (W). Isolation of sinigrin and glucotropaeolin from cruciferous seeds. FAT Science and Technology 90(8); 1988; 311-314

A procedure has been described by which sinigrin or glucotropaeolin can be isolated from the seeds of Brassica nigra and Lepidium sativum as crystalline solids of potassium and tetramethylammonium salts. The absorption spectra of these compounds have been presented. Both compounds possess long term stabilities. N

1020 Von Piechowski (K) and Massop (K). Application of ICP-AES for the determination of trace elements in the oil-and fat-processing industry. **FAT Science and Technology** 90(8); 1988; 315-319 (De).

The detn. of trace elements, also in the oil and fat processing industry, has gained more and more importance during the last yrs. An analytical method suitable for a high sample throughput as well as the possibility of milti-element analyses is the Inductively Coupled Plasma Atomic Emission Spectrometry (ICP-AES). By using the ICP-AES it is possible to determine immediately elements even in traces in oils, fats and fatty acids after dissolution with an organic solvent. The obtainable detection limits are always below 1 mg/kg. The linear measurements range is 10^3 to 10^5 above the detection limit. The relative standard deviations are 1-3%, for several elements below 1%. By extraction of the metals with nitric acid from the samples, the detection limit is distinctly improved. The direct detn. of phosphorus and sulphur in oils using the ICP-AES is possible. AS

Fats

1021 Dobarganes (MC), Perez-Camino (MC) and Marquez-Ruiz (G). High performance size exclusion chromatography of polar compounds in heated and non-heated fats. **FAT Science and Technology** 90(8); 1988; 308-310

1022 Piug-Deu (M) and Buxaderas Sanchez (S). Analysis of arsenic in edible vegetal fats by inductively coupled plasma. **Crasas Y Aceites** 39(3); 1988; 147-150 (Es).

The arsenic is, in very small concn., potentially toxic for the human organism. An analytical method is proposed in order to determine this element in edible fats, based on the destruction of the organic matter by dry process and by subsequent quantification through the hydride generation inductively coupled plasma (HG-ICP). The precision, recuperation and reproducibility of the results are studied comparing these parameters to the admissible margins established by the AOAC and FDA. The arsenic levels in the analyzed samples do not exceed the limits established by the Spanish Legislation and by the Codex Alimentarius Mundi and they involve a very small percentage of the Weekly Tolerable ingestion established by the FAO/OMS with regard to this element. AS

Oils

1023 Graille (J), Pina (M) and Montet (D). Biotechnology of lipids. Some possible applications. **Oleagineux** 43(4); 1988; 188-190

Discusses application of biotechnology in oil extraction and refining (degumming, neutralization and bleaching), oleochemistry (hydrolysis, interestrification, esterification, substituted N amides and modification of aliphatic chains). BV

1024 Helmy (HE), Taha (FS) and El-Nockrashy (AS). Effect of frying green bell pepper on food grade vegetable oil. **Crasas Y Aceites** 39(3); 1988; 155-159

Frying of green bell pepper in high quality vegetable oil results in a transfer of some of the chlorophyll to the oil. The oil shows the characteristic absorption max. of chlorophyll at 667 nm, and the transferred chlorophyll acts as prooxidant to the oil. Confirmation of these findings was reached through an experimental design that included several fryings of fresh green pepper in the vegetable oil and in oil containing chlorophyll, and the stability of the resulting oils. The results reveal that oils containing chlorophyll are more liable to autooxidation than those free from chlorophyll. AS

1025 Jacks (TJ) and Hensarling (TP). Effects of hydrogen peroxide concentration on oilseed protein solubility. **Journal of the American Oil Chemists" Society** 66(1); 1989; 137

Cucurbitin, a typical oilseed protein, was treated with 0-30% hydrogen peroxide lyophilized after removal of hydrogen peroxide and then tested for its solubility in water. Its solubility increased linearly from virtual insolubility in the absence of hydrogen peroxide exposure to about 65 mg/ml after exposure to either 20% or 30% hydrogen peroxide. These results indicated that hydrogen peroxide is effective in producing several ratios of soluble-to-insöluble protein preparations, as represented by cucurbitin. Obtaining desired solubilities of oilseed proteins with hydrogen peroxide could provide ways for the development of new oilseed products. AS

1026 List (GR) and Friedrich (JP). Oxidative stability of seed oils extracted with supercritical carbon dioxide. **Journal of the American Oil Chemists" Society** 66(1); 1989; 98-101

Oxidative stability evaluations of supercritical carbon dioxide extracted oils of dry milled corn germ, soybean and cottonseed flakes showed lesser stability than that of conventionally extracted oils. The lower stability has been implicated to the very low content of phospholipids in the supercritical carbon dioxide extracted oils. The addition of phospholipids to supercritical carbon dioxide extracted oils improves oxidative stability, which suggests that both tocopherols and phospholipids are required for oxidative stability of oils. MNK

Safflower oils

1027 Daood (H) and Al-Ani (H). Biochemical properties of safflower lipase. **Acta Alimentaria** 17(2); 1988; 127-139

True lipase was extracted, partially purified and characterized from the seed of safflower. Sucrose solution of 0.2, mol was the most efficient extracting medium of four solutions used. During the reaction period of 0-22 h, in the first twelve h. the reaction rate was linear and it was proportional to the enzyme concn. Partial purification of 3 fold was achieved by means of gel filteration using Sephadex G-150 column and sucrose solution as eluent. Effect of substrate concn. on the reaction rate followed normal Michaelis-Menten kinetics. The K_m value for the enzyme was 3.3 x 10^{-2} mol and 8 x 10^{-3}

mol with Tween 80 and tributyrin as substrates, resp. The optimum pH range was 8.5-9, whereas the stability, was highest in the alkaline pH range between 8-10. The enzyme showed max. activity at 30 C, while the heat stability study indicated that the enzyme is heat sensitive under the conditions applied. The enzyme was found to be specific to long chain fatty acid esters of low degree of saturation. Inhibition and activation of the enzyme by some chemicals are also included in this work. AS

Shortenings

1028 deMan (L), deMan (JM) and Blackman (B). Physical and textural evaluation of some shortenings and margarines. **Journal of the American Oil Chemists" Society** 66(1); 1989; 128-132

Solid fat content of shortening and margarine was estimated by pulsed NMR. These values were compared with those of the melted fats using different cooling methods. Solid fat content of shortenings measured at 10 and 20 C followed the same trend as those measured on the melted fat tempered at 30 C. Solid fat content of margarines followed the same trend as those measured on the nontempered fats. Softening points of the products were similar to the dropping points of the fats, as were the temp. of the DSC major melting peaks. Compression tests of cylindrical samples provided more information about textural characteristics of the products than one penetration tests. AS

Soybean oils

1029 Al-Kahtani (HA). Quality of soybeans and their crude oils in Saudi Arabia. **Journal of the American Oil Chemists" Society** 66(1); 1989; 109-113

Fourteen locally grown soybean var. and their extracted crude oils were analysed for their physical and chemical characteristics. MNK.

1030 Jung (MY), Yoon (SH) and Min (DB). Effects of processing steps on the contents of minor compounds and oxidation of soybean oil. **Journal of the American Oil Chemists" Society** 66(1); 1989; 118-120

The processes of degumming, alkali refining, bleaching and deodorization removed 99.8% phospholipids, 90.7% iron, 100% chlorophyll, 97.3% free fatty acids and 31.8% tocopherols from crude soybean oil. The correlation coeff. between the removals of phosphorus and iron in soybean oil during processing was r = 0.99. The relative ratios of alpha, beta, gamma- and theta-tocopherols in crude oil, degummed oil, refined oil, bleached oil and deodorized soybean oil were almost constant. gamma- and theta-tocopherols represented more than 94% of tocopherols in soybean oil. The order of oxidation stability of oil is crude > deodorized > degummed > refined > bleached oil. AS

SPICES AND CONDIMENTS

Spices

1031 Akgul (A) and Kivanc (M). Inhibitory effects of six Turkish thyme-like spices on some common food-borne bacteria. **Nahrung** 32(2); 1988; 201-203

The object of this work was to study and compare the effects of 6 Labiatae leafy spices used as thyme from wild growing plants in different regions of Turkey on growth of bacteria in culture media, using organisms known to cause food spoilage or food-borne illnesses. AS

1032 Singh (L), Mohan (MS) and Sankaran (R). Microbial decontamination of spices by sulphur dioxide and chlorine gases. **Beverage & Food World** 15(3); 1988; 9-12

Presents results of the effectiveness of sulphur dioxide and chlorine gas to reduce the microbial contamination of pepper, turmeric, and chilli. BV

Cardamom

1033 Shaban (MAE), Kandeel (KM), Yacout (GA) and Mehaseb (S). Gas-liquid-chromatographic analysis or the lipid composition of **Elettaria cardamomum** seeds. **Acta Alimentaria** 17(2); 1988; 95-101

Lipid fractions of **Elettaria cardamomum** seeds were obtained by successive soaking in petroleum ether, acetone, diethylether and ethanol, resp. All the lipid samples were analysed for fatty acids, hydrocarbons, tocopherol and sterols. The composition of the lipid fractions showed significant differences; palmitic and oleic were the dominant fatty acids, while smaller amounts of other fatty acids were also detected. The inherent hydrocarbons; C_{22}, C_{24}, C_{25}, C_{26}, C, C_{29}, C_{30} and C_{33} were detected (or not) among the extracts with different percentages. Alpha-Tocopherol was found in all extracts, with max. concn. in the ethanol extract. Ether extract had slightly higher sterol content than the other fractions and included compesterol, desmosterol, beta-sitosterol, stigmasterol, delta chloestatrienol and traces of cholesterol. AS

Ginger

1034 Erler (J), Vostrowsky (O), Strobel (H) and Knobloch (K). Essential oils from ginger (**Zingiber officinalis** Roscoe). **Zeitschrift fur Lebensmittel-Untersuchung und -Forschung** 186(3); 1988; 231-234

Essential oils from ginger rhizomes of different origins, such as **Zingiber officinalis** Rosc from India and Australia, differ remarkably in their terpenoid compositions. The main components of Indian ginger oil are the sesquiterpenoid hydrocarbons, arcurcumene, zingierene, Alpha-farnesence, Beta-bisabolhene and Beta-sesquiphellandrene.

However, the essential oil from the Australian ginger consists mainly of the monoterpenoid hydrocarbons, camphene and phellandrene, and their oxygen-containing derivatives neral, geranial and 1, 8 cineol. AS

Tamarind juice

1035 Mukunda (MR), Thomas (D) and Potty (VH). A status survey of tamarind juice beverage in Asia. **Beverage & Food World** 15(3); 1988; 27-29

SENSORY EVALUATION

1036 Marshall (RJ) and Kirby (SPJ). Sensory measurement of food texture by free-choice profiling. **Journal of Sensory Studies** 3(1); 1988; 63-80

1037 Vickers (Z). Sensory specific satiety in lemonade using a just right scale for sweetness. **Journal of Sensory Studies** 3(1); 1988; 1-8

In this paper the effects of various quantities of lemonade consumed, the order of tasting and the gender of the judge on the judgements made using a just right scale and the optimum level of sucrose in lemonade have been determined. The lemonade samples with sucrose concn. (4-15%) were evaluated by either sip procedure (with 10 ML samples) or a drink procedure (with 60 ML samples) using a just right scale. The results showed that neither the amount of lemonade consumed nor the sex of the subjects during the test had an effect on the scores given to the samples or on the sucrose concn. determined. The less pleasant samples showed characteristic sensory satiety whereas samples rated more pleasant did not show this characteristics sensory satiety. NGKR

FOOD STORAGE

Nil

INFESTATION CONTROL AND PESTICIDES

Infestation control

1038 Collins (PJ), Sinclair (ER), Howitt (CJ) and Haddrell (RL). Dispersion of grain beetles (Coleoptera) in grain partially treated with insecticide. **Journal of Economic Entomology** 81(6); 1988; 1810-1815

Behavioral responses of **Tribolium castaneum** (Herbst) and **Sitophilus oryzae** L. to fenitrothion and of **Rhyzopertha dominica** L. to carbaryl and to bioresmethrin were tested by adding eggs (**S. oryzae** or **R. dominica**) or pupae (**T. castaneum**) to wheat unsprayed or sprayed with insecticide. Grain containing insects was placed above or below another layer of sprayed or unsprayed wheat so that insects could move freely between layers. The recommended application rate commonly used in Australia and sublethal dosage of insecticide were tested. Numbers of live and dead adults and emigrants were counted. Carbaryl and fenitrothion did not affect insect movement, whereas bioresmethrin repelled **R. dominica**. Results indicated that, becaue of its repellent effect, less **R. dominica** than expected will be exposed to bioresmethrin. These results have implications for insecticide bioassay, population modeling, and in studies of the development of resistance. AS

1039 Lalithat (T), Ahmed (SM), Dhanaraj (S) and Venkataraman (LV). Toxicity of seed extracts of phulwara (**Madhuca** butyracea Macb.) on the housefly (**Musca domestica** L.) and pulse beetle Callosobruchus chinensis.). International Pest Control 30(2); 1988; 42-45

Extracts of Phulwara seeds (**Madhuca butyracea** Macb., family: Sapotaceae) were tested for their insecticidal efficacy against the third instar larvae of the housefly, **Musca domestica** L. and adults of the pulse beetle, **Callosobruchus** chinensis. The ethanol extract (fraction 4, the butanol extract containing pure saponins (fraction 6), and the aqueous extract (fraction 7) caused highly significant mortalities, pupal mortalities and reduction in pupal wt. and larval emergence at 0.2% levels and above, when housefly larvae were tested. The toxicity of the three extracts were in the order, aqueous extract > ethanol extract > saponins. These extracts significantly reduced oviposition, adult emergence and grain damage by the pulse beetle at 0.5% level. At 1.0% the extracts were not toxic. The results suggested that the toxicity of the extracts is not solely due to the saponins, but that other insecticidal principles are present. AS

1040 McDonald (d). Making pest control safer. International Pest Control 30(3); 1988; 66-67, 73

Describes a system called "sentinel" for detection, monitoring, prevention measures and detailed reporting, designed for food factories and other premises where infestation is intolerable but where conventional chemical pesticides are also unacceptable in other than minimal doses. BV

1041 Su (HCF) and Horvat (R). Investigation of the main components in insect-active dill seed extract. Journal of Agricultural and Food Chemistry 36(4); 1988; 752-753

In previous studies, dill (**Anethum graveolens** L.) seed acetone extract was biologically active against several sp. of stored-product insects and also gave long-lasting repellency against the confused flour beetle, **Tribolium confusum** Jacquelin du Val. The extract was analyzed by HPLC monitored with a UV detector at various wavelengths. The major components were isolated, purified by TLC and HPLC techniques, and identified as 2-methyl-5-(1-methylethenyl)-2-cyclohexen-1-one (d-carvone) and 4, 5-dimethoxy-6-(2-propenyl)-1-3- benzodioxole (dillapiol). AS

BIOCHEMISTRY AND NUTRITION

Proteins

1042 Mozhaev (VV), Berezin (IV) and Martinek (K). Structure stability relationship in proteins. Fundamental tasks and strategy for the development of stabilized enzyme catalysts for biotechnology. **CRC Critical Reviews in Analytical Chemistry** 23(3); 1988; 235-281

The problem of relationships between the protein structure and its stability comprises two major questions. First, how to elucidate the peculiarities of the protein structure responsible for its stability. Second, knowing the general mol. basis of protein stability, how to change the structure of a given protein in order to increase its stability. This review is an attempt to show the modern state of the first (fundamental) and the second (applied) aspects of the problem. AS

1043 Nakamura (R), Mizutan (R), Yano (M) and Hayakawa (S). Enhancement of emulsifying properties of protein by sonicating with egg yolk lecithin. **Journal of Agricultural and Food Chemistry** 36(4); 1988; 729-732

Emulsifying properties of several globular proteins except lysonzyme and ovomucoid were greatly enhanced by sonicating with egg yolk lecithin. Much enhancement was attained when the sonication was carried out at acidic pH regions such as pH less than or equal to 4. The results of gel filtration experiments clearly showed that the formation of protein-lecithin complex was the cause of this enhancement. When ovomucoid and lysozyme were previously incubated with a small amount of dithiothreitol, their emulsifying properties were improved by sonicating with egg yolk lecithin. AS

Nutrition

1044 Ahmed (AR), Appu Rao (AG) and Ramanatham (G). Effect of autofermentation on the physicochemical properties of proteins of sorghum-groundnut composite flour. **Journal of Agricultural and Food Chemistry** 36(4); 1988; 690-694

The effect of autofermentation on the physicochemical properties of proteins of sorghum-groundnut (70:30 by wt.) composite flour is studied by sedimentation velocity measurements, gel filtration on ACA-44, polyacrylamide gel electrophoresis at pH 9.2, spectral measurements, fluorescence spectra, and circular dichroism measurements. Sedimentation velocity measurements, gel filtration, and PAGE suggest a decrease in the molecular size of the proteins due to autofermentation. Both groundnut and sorghum proteins are equally susceptible to proteolysis during fermentation. The spectral measurements indicate increased polyphenol-protein interactions, conformational changes in the proteins resulting in an altered chromophoric environment of aromatic amino acids, and a decrease in the content of the limited ordered structure. AS

1045 **Anita Macdonald**. Cow's milk allergy and intolerance. Journal of the **Society of Dairy Technology** 41(3); 1988; 66-67

From the health and nutrition point, the paper identifies cow's milk as one of the commonest food antigens. Intolerance to it may occur singly or in conjunction with other foods. Milk allergy and intolerance can cause a multitude of symptoms. The precise diagnosis is often difficult to make and depends on careful dietary management. It is usually only a temporary condition but it is essential that withdrawal of milk from the diet is carefully supervised by a dietition as milk plays such an important part in the diet of a young child and infant. MCV

1046 **Askew** (EW). Nutrient requirements for high-stress environments. **Activities Report** 40(2); 1988; 104-110

1047 Bidlack (WR) and Smith (CH). Nutritional requirements of the aged. CRC **Critical Reviews in Food Science and Nutrition** 27(3); 1988; 189-218

1048 De Clmente (IM). Dietary fiber, physical properties and physiological effects. **Industrie Alimentari** 27(257); 1988; 106-108 (It).

Physical properties and physiological effects of dietary fibers as it relates to pathologies typical of Western culture are discussed. **AS**

1049 Haenel (H). Comparison of nutrition habits in potsdam two centuries ago with modern developments. **Nahrung** 32(2); 1988; 151-156

Nutrition habits in the 18th century are described using as examples a menu of the Prussian King, the weekly menu in the Potsdam military orphanage, and the daily ration for a soldier of the Prussian army. Due to the social and scientific progress the quality of nutrition has improved in many respects. Compared to past times there are today no dificiencies in energy and essential nutrients, if knowledge and behavior are in accord. Full employment, high purchasing power ans sutable prices for basic food are the premises form good nutrition. The wide-spread desire for a nutrition of high hedonic value connected with a broad food choice has nutrutional advantages but as well the potential disadvantage of overnutrition. The hygienic quality of food has probably never been as high as today. AS

1050 Pearce (KN) and Friedman (M). Binding of copper (II) and other metal ions by lysinoalanine and related compounds and its significance for food safety. **Journal of Agricultural and Food Chemistry** 36(4); 1988; 707-717

Sanni (AI) and Oso (BA). Nutritional studies on agadagidi. **Nahrung** 32(2); 1988; 169-172

The analysis showed a gradual fall of the sugar content as fermentation period increased. Ascorbic acid content decreased while nitrogen and crude protein increased during fermentation. The predominant amino acids are leucine, lysine, valine, asparagine and glutamic acid, methionine, and phenylalanine. AS

1052 Stanton (J). The effects of single nutrient restriction on total nutrition. The sodium case. **Activities Report 40(2); 1988; 98-103**

TOXICOLOGY

Mycotoxins

1053 Jain (RK) and Nandita Kar. Are we eating carcinogens. **Beverage & Food World** 15(3); 1988; 40-42

Aspects covered include biological effects of mycotoxins (on animals and humans) structure, factors responsible for aflatoxin production (genetial fungual synergism, moisture, aeration, storage period, temp. solil, harvest and postharvest equipments), regulatory measures and cotrol measures. BV

Aflatoxins

1054 Fukal (L), Reisnerova Rauch (P). Applications of radioimmunoassay with 125-iodine for determination of aflatoxin B_1 in foods. **Sciences des Aliments** 8(3); 1988; 397-403

The simple and sensitive radioimmunoassay previously developed was applied to the detn. of aflatoxin B_1 in spiked food samples. Before the radioimmunoassay procedure was performed a considerable amount of interfering substances was removed from crude chloroform extracts using Sep-Pak cartridge clean-up. This made possible the detection of 0.1, 0.5, 0.5, 0.1, and 1.0 μg of aflatoxin B_1 per kg sample of wheat, corn, peanut, muscle and liver, resp. Percentages of recovery for aflatoxin in B_1 were 77-128% in the range of detection limit to 10.0 μg/kg. If crude chloroform extracts were not treated with Sep-Pak, false positive results prevented positive detection of aflatoxin B_1 at concn. less than 1.0 μg/kg. AS

1055 Goto (T) and Manabe (M). Application of ELISA to aflatoxin analysis. Results of preliminary tests of analysis kits on the market. **Report of the National Food Research Institute '(Shokuryo Kenkyusho Kenkyu Hokoku')** 63(3); 1988; 53-59 (Ja).

1056 Keshri (RC), Joshi (HB) and Sharma (N). Aflatoxins in food animals. **Beverage & Food World** 15(3); 1988; 13-14

1057 Sen (AC), Wei (CI), Fernando (SY), Toth (J), Ahmed (EM) and Dunaif (GE). Reduction of mutagenicity and toxicity of aflatoxin B1 by chlorine gas treatment. **Food and Chemical Toxicology** 26(9); 1988; 745-752

Chlorine gas was used to treat aflatoxin B_1 (AFB1). The time-related exposure study showed that 4 ml (15 mg) pure chlorine gas caused about 90% destruction of 100 μg AFB1 within 10 min, at standard temp. and pressure. Four fluorescent reaction products were produced, two of which were identified as 8, 9-dicloro AFB1 and 8, 9-dihydroxy-AFB1 (diol). The use of (^{14}C)AFB1 confirmed the 90% destruction of the compound by chlorine gas. An increased destruction of AFB1 also occurred when an increased amount of chlorine gas was used. The mutagenic activity of the AFB1 sample treated for 10 min was reduced to about 5% of the untreated control using the Salmonella typhimurium strain TA98 in the presence of a rat-liver-S-9 mix. A similar time-related reduction in AFB1 toxicity after chlorine treatment was also achieved using the chicken embryo toxicity assay. AS

Pesticide residues

1058 Van den Broek (HH), Hermes (GBM) and Gorewie (CE). Determination of fentin residues in potatoes and celery. Analyst 113(8); 1988; 1237-1239

An analytical procedure is described for the detn. of residues of the fungicide fentin (triphenyltin acetate) from potatoes and celery. The method utilises a simple sample extraction procedure involving maceration with hexane followed by a methylation step using a Grignard reaction with methylmagnesium chloride. Samples are determined by packed coloumn gas chromatography with flame photometric detection. The limit of detn. is 2 u g kg^{-1}, which is well below the max. concn. of fentin allowed in the substrates concerned (0.1 and 1 mg kg^{-1} for potatoes and celery, resp.). At spike levels of 0.1 mg kg^{-1} the recovery from potatoes was 84 plus or minus 2% (n 5); at 0.01 mg kg^{-1} this value was 82 plus or minus 7% (n 7). The blank value for potatoes, bought in a grocery store, was 2.8 µ g kg^{-1}. AS

FOOD LAWS AND REGULATIONS

Caffeine

1059 Stavric (B). Methylxanthines toxicity to humans. 2. Caffeine Food and Chemical Toxicology 26(7); 1988; 645-662

This paper, the second of three, is intended to provide an overview of the human toxicity of caffeine. Only pertinent and recent information on caffeine toxicity is summarized. In addition, some information regarding the benefits of caffeine and the mechanism of its effects is also provided. The use, effects and toxicity of caffeine intake are reviewed separately for different segments of the population. Controversy concerning the possible association of caffeine with fibrocystic disease of the breast and over the behavioural effects of the drug is presented briefly. BV

__Just Published__

BANANA IN INDIA

Production - Preservation - Processing

An informative industrial monograph covering production, propagation, cultivars, harvesting, yield, chemical composition and post harvest technologies for handling, transportation, storage, ripening, marketing and export of banana. The processed products covered include banana pulp, fig, liquid fruit, juice concentrate, toffee, deep fat fried chips, powder, fruit bar, squash and brandy. Brief note on physiological disorders and suggestions to minimise losses in marketing channel adds further to the usefulness of the publication. Price Rs.30/- + VPP charges.

Our forthcoming publications in the Series:

1. Orange in India
2. Mango: an Industrial Profile

All correspondence should be addressed to:

The Area Coordinator
FOSTIS
CFTRI, Mysore - 570 013.

GENERAL

1060 Flanagan (R). New standards of safety. Food Manufacture 63(11); 1988; 67-68

Covers different types of hazards, machine design considerations, guard design, interlocking considerations, and ergonomic data. BV

1061 Forbes-Ewan (CH). Feeding Australia's defence forces. Food Technology in Australia 40(6); 1988; 228-231

This review outlines the methods of feeding used by Australian Army, Navy and Air Force and the role of the Armed Forces Food Science Establishment (AFFSE) in improving feeding systems for the Armed Forces. This also covers ration scales for the Australian Defence Force Field feeding-ration packs, Naval feeding (victualling) which is based on a monetary allowance and improvement of army ration packs. NGKR

FOOD PROCESSING

1062 Mohr (K-H) and Kirschstein (U). Sterilization safety and quality retention. Nahrung 32(4); 1988; 383-392

A method for calculating sterilization conditions yielding optimum quality retention for conduction and convection type heating of packaged food is demonstrated. The simple calculation of the optimum process parameters requires only a few minutes. AS

Extrusion cooking

1063 Marty (C) and Berset (C). Degradation products of trans-Beta-carotene produced during extrusion cooking. Journal of Food Science 53(6); 1988; 1880-1886

Fifteen coloured compounds, arising from the degradation of all-trans-Beta-carotene in extrusion cooking, were isolated by preparative column chromatography and high performance liquid chromatography (HPLC) and identified using chemical and spectrometric methods: six stereoisomers of beta-carotene, one diepoxide derivative, five apo-carotenals, a polyene ketone, one dihydroxide derivative, and one monohydroxide diepoxide derivative. The HPLC fractionation might be useful in food quality control for varied applications. AS

FOOD PACKAGING

1064 Agarwal (SR). Recent advances in flexible packaging of food products. Indian Sugar 38(6); 1988; 483-489

This exhaustive review covers comparative strength, water vapour transmission rate, oxygen transmission rate, deadfold characteristics, and heat stability of packaging materials, selection criterion for cost effective flexible laminate; metallizing; co-extrusion; filling system; cost comparison using different packaging materials, and application of various packaging materials for food products. KAR

1065 Brewbaker (PL) and Henderson (JM). Strength characteristics of pressurized cans. Journal of Food Process Engineering 10(3); 1988; 199-216

To study the strength advantages of pressurized cans used for food packaging, two indicators of can strength, max. axial load and max. external pressure, were investigated experimentally. Unbeaded 303 x 406 steel cans having several thicknesses and tempers with various internal pressures were tested. Also tested were beaded steel cans and aluminum cans with 206 x 406 dimensions. Failure of the cans was by both buckling and yielding. The results indicated that steel can thickness could be significantly reduced, and beading eliminated, by using internal pressure to supplement can strength. AS

Packaging materials

1066 Srivatsa (AN), Nirmala (N), Parameshwaraiah (PM), Ramakrishna (A), Subramanian (V) and Sharma (TR). Suitability of co-extruded films and special laminates for packaging foods. ISI Bulletin 2(6); 1988; 236-139

Currently, multi-layer films are used for making pouches for packaging of various foods, oils, vanaspati (hydrogenated vegetable oil) and others. A study including the variation in thickness, tensile strength and elongation at break of various films, tear strength and bursting strength, seal strength, sealing conditions and oxygen transmission rate and water vapour transmission rate was made of the various films made from combination of different plastics materials. It is concluded that by co-extrusion it is possible to extrude a film of low thickness which imparts substantial savings and also provides good mechanical properties. KAR

Containers

1067 Berry (MRJr) and Bush (RC). Thermal processing retortable plastic containers with metal lids in steam and water with comparisons to metal cans. Journal of Food Science 53(6); 1988; 1877-1879, 1886

Comparative heating studies were conducted for three products in 211 x 214 retortable plastic containers with double-seamed metal lids and in similar sized 211 x 300 metal cans. Plastic cans heated slower than metal cans in both steam and water. Orientation of the metal lid (up or down) influenced heating and the location of the slowest-heating zone. For corn in brine heated in steam, F_0 values for the heating portion of the process were 6.5, 4.2, and 5.0 using the metal can, and plastic cans oriented with lid up and lid down, resp. Similar differences were obtained for cans of water and a conduction heating products. The heating medium and headspace in the container only slightly influenced the F_0 value delivered by the thermal process. AS

Polymer

1068 Figge (K), Rabel (W), Baustian (M) and Meier (F). Influence of the thickness of polymeric packaging materials on the migration of components into fat-releasing foodstuffs. Deutsche Lebensmittel-Rundschau 84(7); 1988; 211-214 (De).

Systematic investigations of the influence of the thickness of PP-specimens; of the performance of sample removal from PP-packaging materials and of various factors involved in the test procedure itself on the quantity of components which migrate out of the PP-test materials into test-fat HM 307 were carried out. In accordance with this objective, several types of PP (polypropylene) with different physical and chemical-structural properties were selected for the investigation. Each PP material was dosed with a defined amount of a ^{14}C labelled antioxidant and then processed into extrusion or pressed films with thickness in the range 30-123 µ m. Specimens of these films were then produced in rectangular and circular forms using a cutting device and a punching tool, resp. The former specimens were brought into all-sided contact with test-fat HB 307; the latter ones were mounted in so called migration cells (2 different types) for one-sided contact with test-fat HB 307. The detn. of the amounts of antioxidant which entered the test-fat HB 307 under various defined contact conditions, from specimens of different source and form, was carried out by radioanalytical means. AS

Polyvinyl chloride

1069 Niebergall (H) and Kutzki (R). Complecation of the results of diphenylurea-migration from polyvinyl chloride. Deutsche Lebensmittel-Rundschau 84(7); 1988; 219-222 (De).

Recently published studies (PUMP^{2}) concerning the migration of diphenylthiourea (DTU) and the reaction products phenyl isothiocyanate (PITC), aniline, and diphenyl-urea (DPU) out of hard PVC-foils into the testing foodstuff HB 307 gave rise to publish some more results of DTU migration into water. In contrast to HB 307, increased values of aniline have been found in water where as DTU, DPU and PITC could not be detected. The method of the model foil preparation by dipping in an additive solution until equilibrium was extensively investigated, again, and is critically discussed. No irreversible morphological changes of the foil had occured, which could effect increased migration values. AS

FOOD ENGINEERING AND EQUIPMENT

1070 Hayakawa (K-I), Massaguer (PD) and Trout (RJ). Statistical variability of thermal process lethality in conduction heating food-computerized simulation. Journal of Food Science 53(6); 1988; 1887-1893

A computerized procedure was developed for estimating the variability of process lethality when there were variations in all independent, thermal process parameters of conduction heating food packages. This was accomplished through the combined application of a Monte Carlo procedure and a reliable mathematical method for thermal process evaluation. By examining published information, statistical variations in physical and reaction kinetic parameters were represented by gamma distributions and others by normal distributions. The coeff. of variations in sterilizing values were estimated from temp. data collected by processing 211 x 300 and 307 x 409 cans of spaghetti in tomato sauce (60 cans each). They agreed well with those computed by the developed computerized procedure. AS

Engineering

1071 Eriksen (J). Ohmic heating new development. Food Technology in New Zealand 23(6); 1988; 56

This paper describes the latest developments in novel processing techniques presented at the Innovate `88 conference which ranged from the use of ohmic heating in the continuous asceptic packaging of viscous and particulate food products to the insertion of powdered iron sachets into packaged foods to mop up oxygen. In this technique an electrical current is passed directly through the body of the foodstuff sterilizing or cooking it and the liquid and particulate are heated virtually simultaneously. The food products which have been successfully processed using the above heater include casseroles such as ham and mushroom in cheese sauce, starchy baby foods, vegetable soups and jams. NGKR

1072 Flores (ES) and Mascheroni (RH). Determination of heat transfer coefficients for continuous belt freezers. Journal of Food Science 53(6); 1988; 1872-1876

Air-product heat-transfer coeff. for belt freezers were determined experimentally. Measurements were performed for foods (beef hamburgers) and a model substance (copper disk) using a prototype tunnel. Air flow parallel, as well as perpendicular to the belt was employed; in the latter case moving upwards or downwards through the belt. From the measured temp., heat-transfer coeff. were calculated using appropriate mathematical methods. Values obtained for both types of materials were compared, and the usefulness of the test substance was discussed. From these data, simple and precise regressions were obtained, useful to predict the coeff. for the above mentioned types of air flow and valid over a wide range of operating conditions in belt freezers. AS

1073 Sugiyama (J). Electrical properties of foods for quality evaluation. Part 2. Journal of Japanese Society of Food Science and Technology '(Nippon Shokuhin Kogyo Gakkaishi') 35(10); 1988; 717-722 (Ja).

Computers

1074 Kaplick (K) and Kloden (W). Computer-aided experiments in food technology. Lebensmittelindustrie 35(2); 1988; 55-58 (De).

Equipments

Dryers

1075 Cenkowski (S) and Sokhansanj (S). Mathematical modelling of radial continuous crossflow agricultural dryers. Journal of Food Process Engineering 10(3); 1988; 165-181

Circular grain dryers in which grainflow is continuous and airflow is in radial direction are widely used as on-farm grain dryers. A concurrent flow drying model is adapted to the crossflow drying of the moving bed of grain. The simulated air and grain temp. and moisture contents of wheat and corn samples were compared to the experimental drying of these grains in lab. dryers. The results show that the model can be used to describe temp. of grain within 1 C and moisture content within 0.3% w.b. AS

ENERGY IN FOOD PROCESSING

Nil

FOOD CHEMISTRY AND ANALYSIS

Chemistry(Analytical)

1076 Amlathe (S) and Gupta (VK). Spectrophotometric determination of trace amounts of hydrazine in polluted water. Analyst 113(9); 1988; 1481-1483

Hydrazine is an important rocket propellant, it is also used as an oxygen scavenger in industry and has found wide application as an antioxidant, a photographic developer and an insecticide. A sensitive spectrophotometric method is developed for the detn. of trace amounts of hydrazine by a one-step condensation reaction with vanillin. The dye thus formed gives a yellow colour in acidic medium, has a max. absorbance at 400 nm. The optimum reaction conditions, such as time, temp., pH, reagent concn. and effect of interferents, were determined for full colour development. The method can be applied for polluted river water and in biological fluid. N

1077 Kurata (T). Recent advances in food analysis 2. Journal of Japanese Society of Food Science and Technology '(Nippon Shokuhin Kogyo Gakkaishi') 35(10); 1988; 723-731 (Ja).

1078 Ridont (PS), Jones (HR) and Williams (JG). Determination of trace elements in a marine reference material of lobster hepatopancreas (TORT-1) using inductively coupled plasma mass-spectrometry. Analyst 113(10); 1988; 1383-1386

Inductively coupled plasma mass spectrometry (ICP-MS) has been used for the analysis of marine reference material of lobstor hepatopancreas (TORT-1). Sixteen elements (V, Cr, Mn, Fe, Ni, Co, Cu, Zn, As, Se, Sr, Mo, Cd, Sn, Hg, and Pb) were determined in acid digests of the samples. Accurate results were obtained for most elements although some signal suppression was observed which was overcome by dilution of the samples. The method has got advantages for the detn. of metals in marine organisms where high variation can occur both in size and metal concn between individual specimens. N

1079 Rijs (V), Martin (S) and Biedermann (W). Determination of the water contents of foods and feeds. Deutsche Lebensmittel-Rundschau 84(7); 1988; 214-217 (De).

Two methods for the specific determination of water in foods and feeds are described, which are based on the extraction of the water and the following detection by near infrared spectroscopy (NIR) and gas chromatography. Prescriptions are given for both variants. The problem of balance in the extraction is discussed and a corresponding vol. correction is included in the calculation of the water content. Results for several samples demonstrate the reliability and the precision of the methods presented. AS

1080 Whang (K) and Peng (C). Detection of singlet oxygen generation by chlorophyll using electron paramagnetic resonance spectroscopy. Journal of Food Science 53(6); 1988; 1918-1919

Electron paramagnetic resonance (EPR) spectroscopy was used to detect the photosensitized generation of singlet oxygen by chlorophyll b. Illumination of a chlorophyll b solution containing a spin trap (2, 2, 6, 6-tetramethyl-4-piperidone, TMPD) yielded pronounced EPR signals for TAN (2, 2, 6, 6-tetramethyl-4-piperidone-N-oxyl) suggesting the presence of singlet oxygen N, N, N', N'-tetramethylethylene diamine (TMEDA, a singlet oxygen quencher) and a combination of TMEDA with a free radical scavenger (butylated hydroxyanisole, BHA) completely eliminated the TAN signal, BHA alone did not exert this inhibitory effect. AS

FOOD MICROBIOLOGY AND HYGIENE

Enzymes

1081 Braun (I) and Kunath (H). Investigations on biochemical properties of milk-clotting enzymes. Nahrung 32(4); 1988; 375-381

The properties of proteolytic enzymes produced from calf maws and from an Ascomycete were studied. Both milk-clotting proteases have their optimum activity at pH 5.2 and 45 C. The microbiological rennin has a second max. activity at pH 3.5 and 55 C. Temp. above 55 C cause a rapid decrease of activity. The behaviour of enzyme activity is similar with varying substrate and enzyme concn. However, increasing amounts of enzyme in ratio to the substrate lead to reaction rates of the calf rennin differing clearly from that of the microbiological rennet complex. AS

Cellulases

1082 Schalinatus (E). Contribution to determination of cellulase activity. Nahrung 32(4); 1988; 417-419

Lysozymes

1083 Boschelle (O) and Pitotti (A). Lysozyme in food stabilization. Suitability in acid medium. Industrie Alimentari 27(259); 1988; 337-340, 344 (It).

Parameters as temp., pH, and sulphur dioxide concn are considered. Lysozyme showed high stability at pH 3.1. Wines components don't negatively interfere with the enzyme's activity. Sulphur dioxide decreases its stability during the time but a significative activity was held a long time at considered sulphur dioxide concn. (up to 26 mg/l). Temp. increases sulphur dioxide effect. AS

Ethyl alcohol

1084 Favea Torres (E) and Baratti (J). Ethanol production from wheat flour by Zymomonas mobilis. Journal of Fermentation Technology '(Hokko Kogaku Zasshi') 66(2); 1988; 167-172

Starch from wheat flour was enzymatically hydrolyzed and used for ethanol production by Zymomonas mobilis. The addition of a N source like ammonium sulphate was sufficient to obtain a complete fermentation of the hydrolyzed starch. In batch culture a glucose concn as high as 223 g/l could be fermented (conversion 99.5%) to 105 g/l of ethanol in 70 h with an ethanol yield of 0.47 g/g (92% of theoretical). In continuous culture the use of a flocculent strain and a fermentor with an internal settler resulted (at D = 1, 4 h^{-1}) in a high ethanol productivity of 70.7 g/l-h with: ethanol concn 49.5 g/l, ethanol yield 0.50 g/g (98% of theoretical) and substrate conversion 99%. AS

1085 Nellaiah (H), Karunakaran (T) and Gunasekaran (P). Ethanol fermentation by an efficient strain, NRRL-4286, of Zymomonas mobilis. Journal of Fermentation Technology '(Hokko Kogaku Zasshi') 66(2); 1988; 219-223

The effect of the initial substrate concn over the range of 100-250 g.l on the fermentation kinetics in batch cultures of Zymomonas mobilis NRRL B-4286 on glucose, fructose, and sucrose, using an adapted initial inoculum was studied. With increasing concn of substrate, parameters related to growth were more rapidly and strongly affected than those raelted to ethanol production. This strain produced 94.0 $g.l^{-1}$ 76.9 $g.l^{-1}$ and 66.5 $g.l^{-1}$ of ethanol at glucose, fructose, and sucrose concn. of 200 $g.l^{-1}$ resp., more than the amount produced by the efficient strain ZM4 (NRRL B-14023). AS

Fermentation

1086 de Soet (JJ) and de Graff (J). An improved method with computer registration of fermentation activities of microorganisms. Journal of Fermentation Technology '(Hokko Kogaku Zasshi') 66(2); 1988; 239-242

This paper describes a computer controlled fermentation system that can being enlarged to do 8 titration experiments simultaneously using one low budget microcomputer. Thus long term fermentation experiments as well as large quantities of fermentations can be done easily. AS

Fermented foods

Ogi

1087 Akinyele (IO) and Fasaye (OA). Nutrient quality of corn and sorghum supplemented with cowpeas (V. unguiculata) in the traditional manufacture of ogi. Journal of Food Science 53(6); 1988; 1750-1752, 1755

Protein in ogi, a fermented cereal food common in Nigeria, prepared from 100% corn increased from 9.1 g to 13.1 and 14.4 g in ogi supplemented with 30% and 40% cowpea, resp. Similarly, protein in ogi from 100% sorghum increased from 7.1 g to 8.4 g for ogi at 30% and 11g at 40% cowpea supplementation. A 100% acceptability score was obtained for ogi made from 70% corn supplemented with 30% dehulled cowpea. An acceptability score of 70% was obtained for ogi from 70% sorghum or corn and 30% dehulled cowpea. However, ogi from 60% sorghum or corn and 40% whole cowpea was least acceptable with a score of 20%. AS

Microorganisms

Spirulina maxima

1088 Kawamata (M), Murakami (M), Yamaguchi (K) and Konosu (S). Extractive Nous components of the blue-green alga (Spirulina maxima). Bulletin of the Japanese Society of Scientific Fisheries ('Nihon Suisan Gakkaishi') 54(8); 1899; 1453

A commercial preparation of spray dried Spirulina maxima was analysed for the extractive Nous components in 70% and 80% ethanol; the components have almost completely been resolved. Total N was 248 mg and 184 mg per 100 g on dry wt. basis. The free amino acid composition showed little difference between the extracts. Nucleotides and related compounds (AMP and cytosine being the major ones) were more in the 70% ethanol extract. Glutamic acid and an uncommon amino acid phosphoserine comprised of about 60% and 10% resp. of the total free amino acid pool which constituted 15-20% of the total extractive N. Nucleotides and related compounds accounted for 41-45% of the total extractive N. Acid hydrolysis of the extracts increased some of the amino acids content indicating the presence of low mol. peptides which accounted upto 36% of the total extractive N. Homarine was found to be abundant along with a small amount of trigonelline, an isomer of homarine. SGB

Bacteria

Aeromonas hydrophila

1089 Sofos (JN), Maga (JA) and Boyle (DL). Effect of ether extracts from condensed wood smokes on the growth of Aeromonas hydrophila and Staphylococcus aureus. Journal of Food Science 53(6); 1988; 1840-1843

Ether extracts of smoke condensates ("liquid smokes") from 20 different woods were screened for antimicrobial activity. Testing was done in trypticase soy broth of pH values in the range of 5.78-6.81 against three strains each of Aeromonas hydrophila (ATCC 7965, KI414, BW 37) and Staphylococcus aureus (ATCC 12600, LP, S6) incubated at 35 C. There was variation in inhibition of growth among types of liquid smoke, sp. and strains of microorganisms tested. Staphylococcus aureus was generally more sensitive to inhibition than A. hydrophila strains. The most inhibitory liquid smoke was derived from the sapwood of douglas fir. Other inhibitory liquid smokes were from birch, southern yellow pine, and aspen. The least inhibitory liquid smokes were derived from lodge pole pine and mesquite woods. AS

Pseudomonas oleovorans

1090 Brandl (H), Gross (RA), Lenz (RW) and Fuller (RC). Pseudomonas oleovorans as a source of poly (Beta-hydroxyalkanoates) for potential applications as biodegradable polyesters. Applied and Environmental Microbiology 54(8); 1988; 1977-1982

Pseudomonas oleovorans was grown in homogeneous media containing n-alknoic acids (formate to decanoate) as sole carbon. Formation of intracellular poly (Beta-hydroxyalkanoates) was observed only for hexanoate and the higher n-alkanoic acids. The max. isolated polymer yields were approx. 30% of the cellular dry wt. with growth on either octanoate or nonanoate. The wt. average mol. wt. of the poly (Beta-hydroxyalkanoate) copolymers produced by P. oleovorans ranged from 90,000 to 370,000. These copolyesters represent an entirely new class of biodegradable thermoplastic. RJ

Salmonella

1091 D`Aoust (JY) and Sewell (AM). Detection of Salmonella with BioEnzabead enzyme immunoassay technique. Journal of Food Protection 51(7); 1988; 538-541

The performance of the double-antibody (MOPC 467 and 6H4) BioEnzabead enzyme-linked immunosorbent assay was evaluated with pure cultures and naturally contaminated foods. The immunoassay detected all but four (1.6%) of the 250 Salmonella test strains and showed high levels of cross-reactivity (30.7%) among the 75 strains of non-salmonellae examined. Citrobacter freundii figured prominently as a source of erroneous results. Although the BioEnzabead system identified the 41 foods found to be contaminated by a standard cultural procedure, a high rate of false-positive reactions (46%) was nevertheless encountered with high moisture foods. Attempt at method brevity through application of the immunoassay at the preenrichment level was unsuccessful resulting in the detection of only 24 (58.5%) of the 41 contaminated foods. Greater recoveries were obtained with tetrathionate brilliant green enrichment broth incubated at 43 C than at 35 C. AS

1092 Liang (C) and Fung (DYC). Performance of some heat sensitive differential agars prepared and melted by microwave energy. Journal of Food Protection 51(7); 1988; 577-578

There was no difference in the performance of violet red bile agar, bismuth sulphite agar, KF-Streptococcus agar, and desoxycholate citrate agar prepared by conventional boiling method and the microwave oven heating method for viable cell counts of target bacteria Salmonella choleraesui, Streptococcus faecalis and Eschrichis coli. Remelting of desoxycholate citrate agar by both methods resulted in substantial lowering of counts. CTD

1093 Sall (BS), Lombardo (M), Sheridan (B) and Parsons (GH). Performance of a DNA probe-based Salmonella test in the AACC check sample program. Journal of Food Protection 51(7); 1988; 579-580

The performance of DNA probe-based Salmonella test developed by GENE-TRAK has been evaluated to check samples provided by American Association of Cereal Chemists. The test correctly identified positive and negative samples, which included a lactose positive Salmonella strain. DNA probe technology not only takes lesser time for analysis compared to conventional methods but also more accurate results are obtained. CTD

Fungi

Aspergillus oryzae

1094 Yano (T), Ito (M), Tomita (K), Kumagai (H) and Tochikura (T). Purification and properties of glutaminase from Aspergillus oryzae. Journal of Fermentation Technology '(Hokko Kogaku Zasshi') 66(2); 1988; 137-143

Gultaminase activity was found in a water extract of a wheat bran Koji culture (extracellular fraction) of Aspergillus oryzae strains` Lee-1', `H-16' and `MA-27-IM' isolated from a commercial Koji seed for soy sauce fermentation, as well as in their mycelia (intracellular fraction). Both the intracellular and the extracellular glutaminases were purified from strain MA-27-IM. Polyacrylamide gel electrophoresis of each purified preparation gave a single protein band with identical electrophoretic mobility. The mol. wt. of the intracellular and the extracellular glutaminases were estimated to be approx. 113,000. Both preparations hydrolyzed various Gamma-glutamyl compounds besides L-glutamine but did not exhibit asparaginase activity. Further investigations of these preparations indicated that these glutaminases possessed almost the same properties, suggesting their similarity. AS

Aspergillus parasiticus

1095 Buchanan (RL), Stahl (HG), Wiseman (DW), Zaika (LL) and Mertz (SE). Further characterization of a caffeine-resistant mutant of Aspergillus parasiticus. Journal of Food Science 53(6); 1988; 1858-1862, 1876

Studies were performed to characterize further Aspergillus parasiticus BCRI, a caffeine-resistant mutant of A. parasiticus NRRL 2999, particularly in regard to its caffeine-dependent production of aflatoxins. The enhanced synthesis of aflatoxins by caffeine was highly specific since neither dimethylxanthines nor purines could substitute for the trimethylxanthine. Caffeine's effects were phase dependent and only increased toxin formation if added early in the microorganism's life cycle. The ability of BCRI to exclude caffeine appeared dependent on the initial levels of caffeine in the growth medium. Respiration and glucose utilization in the wild type strain were inhibited strongly by caffeine, but BCRI was resistant to these effects. Comparison of glucose uptake kinetics in the wild type and mutant strains indicated that caffeine inhibition of aflatoxin synthesis in the wild type was not due to a disruption of glucose transport. AS

Mushrooms

1096 Beelman (R). Factors influencing post harvest quality and shelf life of fresh mushrooms. Mushroom Journal 182; 1988;

Various factors influencing post harvest quality and the shelf life of fresh mushrooms and the preservation methods to avoid spoilage particularly washing and low-dose gamma irradiation are discussed. MVG

1097 Burton (KS). Modified atmosphere packaging. A new technology for extending mushroom storage-life. Mushroom Journal 183; 1988;

1098 Elliott (TJ). Genetic engineering and mushrooms. Mushroom Journal 183; 1988;

Yeasts

Saccharomyces cerevisiae

1099 Cerrutti (P), Alzamora (SM) and Chirife (J). **Effect of potassium sorbate and sodium bisulphite on thermal inactivation of Saccharomyces cerevisiae in media of lowered water activity.** Journal of Food Science 53(6); 1988; 1911-1912

The presence of 100 p.p.m. of potassium sorbate caused significant increases in the rate of inactivation of S. cerevisiae suspended in distilled water at pH adjusted to 3.0 and heated at 50 C or 55 C. The addition of sugars (glucose or sucrose) to water activity 0.95 decreased the lethal effects of sorbate mainly when glucose was the sugar added to the heating medium. It was found, however, that a mixture of 50 p.p.m. of sorbate and 50 p.p.m. of sulphur dioxide acted synergistically with heat to rapidly inactivate the yeast during heating even in the presence of glucose. AS

1100 Ough (CS), Kunkee (RE), Vilas (MR), Bordeu (E) and Huang (MC). The interaction of sulphur dioxide, pH and dimethyl dicarbonate, on the growth of Saccharomyces cerevisiae Montrachet and Leuconsotoc oenos MCW. American Journal of Enology and Viticulture 39(4); 1988; 279-282

Wine yeast Saccharomyces cerevisiae Montrachet and malolactic bacteria Leuconostoc oenos MCW were grown in and acclimatized to wine with significant amounts of sulphur dioxide. The cultures were transferred to wine at different pH levels with varying amounts of sulphur dioxide and dimethyl dicarbonate (DMDC). Both compounds were inhibitors to yeast and bacteria growth, and there was a synergistic activity between them. With a free sulphur dioxide level of 25 mg/L and the addition of 50 mg/L DMDC, control of the yeast and the bacteria was excellent at pH 3.6 or lower in a sweet white table wine and a dry red table wine. AS

Hygiene

1101 Comar (D). Equipment and the manufacturing environment-microbiological quality assurance. Food Technology in Australia 40(6); 1988; 214-215, 218

This review describes equipment and the manufacturing environment, microbiological quality assurance. It covers microbiological assessment of manufacturing procedures, microbiological monitoring, microbiological techniques, and summary. NGKR

1102 Tuley (L). Hygiene in the food plant. Food Manufacture 63(8); 1988; 27-33

BIOTECHNOLOGY

Nil

TISSUE CULTURE

Nil

FOOD ADDITIVES

1103 Alwan (AH), Mahmoud (MJ); Naji (A) and Hussein (WA). Antimutagenic activities of phenolic plant flavonoids. Journal of Food Safety 9(3); 1989; 193-200

Total phenolic flavonoids obtained from Thuiz accidentalis L and cirpressus sempevirens L. showed antimutagenic effects on benzo (a) pyrene (B (a) P) in Salmonella typhimurium strain TA 100 and TA 98. Total flavonoids from C. sempevirens showed more antimutagenic activity than flavonoids from T. accidentalis. KMA

Antioxidants

1104 Toyosaki (T) and Mineshita (T). Antioxidant effects of protein-bound riboflavin and free riboflavin. Journal of Food Science 53(6); 1988; 1851-1853

The antioxidant effects of protein-bound riboflavin and free-riboflavin using methyl linoleate in a water system in the dark has been studied. The protein-bound riboflavin inhibited the formation of hydroperoxides. After exposure to light, the protein lost its antioxidant effect, which suggested that it was not the protein-bound riboflavin but the riboflavin itself that had the antioxidant effect. These results showed that riboflavin inhibited the formation of hydroperoxides, which suggested that it did have an antioxidant effect. AS

Emulsifiers

1105 Lukac (J). Isolation of lipids and food additives soluble in lipids. Detection of emulsifiers. Deutsche Lebensmittel-Rundschau 84(7); 1988; 217-219 (De).

For the isolation of emulsifiers the food should be treated with chloroform. The solvent phase is filtered by an extraction column. After the column chromatography the enriched emulsifiers can be analysed by the well known methods. AS

Stabilizers

Gums

1106 Andernon (DMW) and Andon (SA). Water-soluble food gums and their role in product development. Cereal Foods World 33(10); 1988; 844-850

This feature article covers properties and uses of different types of gums such as gum arabic, gum tragacanth, gum karaya, locust bean gum, guar gum, agar agar, alginates, and carrageenans. The advantages of using gums in different bakery products have also been discussed. The type of gums to be chosen for obtaining the desired benefits in different bakery products has also been discussed in this article. PHR

CEREALS

1107 Klopfenstein (CF). The role of cereal Beta-glucans in nutrition and health. Cereal Foods World 33(10); 1988; 865-869

This review deals with cereal beta-glucans and its function as cholesterol lowering agent. The author also discusses its mechanism of action and its possible negative nutritional effects. PHR

1108 Lacrange (V) and Sanders (SW). Honey in cereal-based new food products Cereal Foods World 33(10); 1988; 833-838

This article deals with composition of honey with respect to enzymes, acids, physical and rheological characteristics. Use of honey in bakery products for increasing the sweetness, storage life and improving the overall quality of bakery products has also been discussed. Major steps involved in processing of honey has also been included in this article. PHR

1109 Weibal (R). Present-day trends in flour mill engineering. Indian Miller 18(6); 1988; 15-27

The future development of flour milling industry will be to construct environmentally acceptable machinery with features like smaller air vol. lower power requirement, great ease of operation and easier maintenance, less noise and no accidents, more efficient operation involving automation and process monitroing and quality assurance. The product produced should be of high nutritional value, excellent quality, and attractive appearance. These aspects have been reviewed individually. KAR

Rice

1110 Ghosh (AK) and Mukherjee (S). Studies on the development of methods for production of quick cooking rice. Journal of Food Science and Technology, India 25(4); 1988; 182-185

To produce quick cooking dehydrated rice with short reconstitution time, rice was cooked by boiling for 25 min, partially boiled for 10 min and steamed at 1.1. kg/cm^2 for 5 min or steamed alone for 10 min at 1.1 kg/cm^2 followed by tray drying (both atm. and vacuum), infrared drying, air diffusion drying and freeze drying. Atm. tray drying produced quick cooking rice of inferior quality having low swelling ratio (by wt.) of 3.0-3.6 and long reconstitution time of 10-14 min; the retention of vitamins B_1 and B_2 was also low. In vacuum tray drying, infrared drying and air diffusion drying, the swelling ratios were 3.1-3.7, 3.2-3.7 and 3.4-3.6 with reconstitution times of 9-12, 9-12 and 9-10 min, resp. These also showed higher retention of vitamins B_1 and B_2. Highest swelling ratio of 3.8 with a reconstitution time of 7 min was observed in the freeze dried product; retention of vitamin B_1 and B_2 was also highest in this. AS

1111 Mestres (C), Colonna (P) and Buleon (A). Characteristics of starch networks within rice flour noodles and mungbean starch vermicelli. Journal of Food Science 53(6); 1988; 1809-1812

Starchy networks within mungbean starch vermicelli and rice flour noodles are characterized by differential scanning calorimetry, X-ray diffraction, mild acid hydrolysis, and gel permeation studies. In these products, native starch structures disappeared but new crystalline organizations were found. An amylopectin-based crystallinity was evident from its B-type diffraction pattern, melting endotherm at 50 C and high susceptibility towards mild acid hydrolysis. In addition, amylose-based structures were present either in the complexed form (V-type) in rice flour noodles, or in the retrograded form (B-type) in both pasta-like products. These latter crystallites were highly resistant towards mild acid hydrolysis and melted at high temp. Both gluten free pasta-like products exhibited good cooking behaviour which can be attributed to these amylose networks. AS

Wheat

1112 Bains (GS). Wheat quality: the chemical basis of the end use of wheat. Indian Miller 18(6); 1988; 5-7, 9, 11, 13-14

This paper reviews the chemistry of wheat constituents and the interacting biopolymer associations of proteins, carbohydrates and lipids. It highlights the functionality of proteins; the role of gluten in wheat, starch quality; non-starch polysaccharides; interaction of lipids, protein and polysaccharide; and fractionation and reconstitution of flour components. 36 references. KAR

1113 Gupta (NK). Improvement in productivity through modernization and use of modern technology. Indian Miller 19(2); 1988; 25, 27, 29, 31, 33

The aspects covered include tailor made mill buildings, selection of proper machines and equipment, appropriate conveying system, conditioning system for wheat, method of power conservation and man power allocation. KAR

1114 Hirsch (W). Production and maintenance of rolls for flour mills. Indian Miller 19(2); 1988; 35, 37, 39, 41, 43,

The article covers various aspects of rolls including production of rolls, foundry techniques, mechanical finishing of rolls, maintenance of smooth rolls in good working condition and fluting of rolls including the fluting diagram for hard and medium hard wheat table for different angles. KAR

1115 Russell (GE). Evaluation of four analytical methods to detect weevils in wheat. Granary Weevil, Sitophilus granarius (L)., in soft white wheat. Journal of Food Protection 51(7); 1988; 547-553

Three FDA methods and a simple visual counting method used for detection of granary weevil (Sitophilus granarius L.) in wheat has been evaluated to illustrate how the results of four methods related to one another to analytical procedure used and to the infestation rate. Data confirmed visual examination of wheat is not a reliable for indicating the hidden weevils. The two methods which could be used to estimate potential flour contamination by weevils are the `X' ray examination and cracking and flotation method as both methods reveal the stages of weevil development inside the kernels. CTD

MILLETS

1116 Monteior (PV), Sudharshana (L) and Ramachandra (G). Japanese barnyard millet (Echinochloa frumentacea). Protein content, quality and SDS-Page of protein fractions. Journal of the Science of Food and Agriculture 43(1); 1988; 17-25

Total protein from five var. of Japanese barnyard millet (Echinochloa frumentacea) was separated into albumin/globulin, prolamin and glutelin fractions. The protein fractions were examined by sodium dodecylsulphate polyacrylamide gel electrophoresis. Total protein of the var. ranged from 110.5 to 139.3 mg g^{-1} of which 11.3-17.2% was albumin/globulins, 6.8-9.3% prolamins, 7.5-11.6% prolamin-like, 5.9-9.1% glutelin-like and 39.3-54.4% true glutelins. Amino acid analyses of the total protein showed that the var. had essentially the same amino acid composition. With the exception of lysine the amino acid levels adequately matched the provisional FAO scoring pattern. The amino acid composition of the protein fractios was also very similar. Electrophoretic analysis showed that the albumin/globulin fraction contained three or four components; the prolamin and glutelin fractions each had five components. The glutelin fraction had higher mol. wt. components than the other two fractions. AS

Corn

1117 Gupta (HO) and Joginder Singh. Iron and its availability in maize (Zea mays L.). Journal of Food Science and Technology, India 25(4); 1988; 179-181

The study was undertaken to determine the status of Fe in `Opaque-2' (both soft and hard endosperm types which are known to be high in mineral, lysine and tryptophan contents) and normal maize var. after processing. Total Fe content in `Ganga-5' (normal endosperm), SO/SN composite (hard endosperm type) and `Shakti' composite (soft endosperm) kernels was 2.34, 5.72 and 7.70 mg/100 g, and the soluble fraction being 66.7, 68.01 and 75.1% resp. Removal of pericarp slightly decreased the Fe content. Fe content in any of the three var. was not reduced on boiling. Estimates of Fe availability in these three var. followed a pattern similar to those for soluble iron. AS

1118 Krishna Reddy (V) and Reddy (SM). Biochemical changes and patulin and terreic acid production by Aspergillus terrus in different cultivars of maize (Zea mays Linn). Journal of Food Science and Technology, India 25(4); 1988; 247-248

Pearl millet flour

1119 Dhankher (N), Chauhan (BM) and Khetarpaul (N). Microbiology of Rabadi-a less known Indian fermented food. Indian Journal of Microbiology 28(3-4); 1988; 216-219

Pearl millet flour was mixed with butter milk and fermented at 35, 40, 45 and 50 C for 3, 6 and 9 h to prepare Rabadi. The major groups of microorganisms found in unfermented mixture included yeasts, lactobacilli and coliforms. During fermentation, all the microorganisms multiplied with lactobacilli showing highest increase followed by yeasts and coliforms at all temp. The pH decreased whereas the titratable acidity increased as the fermentation increased and it was max. at 45 C. KAR

Popcorn

1120 Lin (YE) and Anantheswaran (RC). Studies on popping of popcorn in a microwave oven. Journal of Food Science 53(6); 1988; 1746-1749

The popping performances of five different var. of popcorn with moisture contents ranging from 8-18% w.b. were studied using a Litton microwave oven. Each var. was found to have different optimum moisture contents for max. expansion vol. and for min. unpopped kernel ratio. In one var. (M-045) the expansion vol. correlated with the size of the kernels. Long term frozen storage increased the popped vol. in comparison with storage at room temp. The effect of salt and oil on the popping performance of popcorn was complex. The presence of any surface damage on the kernels decreased the expansion vol. significantly. AS

Sorghums

1121 Gomez (MH), Waniska (RD), Rooney (LW) and Lusas (EW). Extrusion-cooking of sorghum containing different amounts of amylose. Journal of Food Science 53(6); 1988; 1818-1822

Three sorghums containing different amounts of amylose (12.2, 21.5, and 26.7%) were decorticated, ground and extruded at three extrusion moisture levels (17, 32, and 45%). Highly expanded and brittle sorghum extrudates with high degree of starch cooking were produced at 17% extrusion moisture content. All sorghum extrudates exhibited a V-amylose X-ray diffraction pattern. Functional characteristics, such as expansion, enzyme-susceptible starch ratio, and water solubility, indicated that low amylose extrudates were more cooked than other var. Thin porridges prepared from extruded sorghums had an intermediate consistency, smooth texture, roasted flavour and white colour. Thin porridges (atoles) from extrudates containing 21.5% amylose, were preferred by a sensory panel over those from extrudates containing 12.2 and 26.7% amylose. AS

PULSES

1122 Wilson (KA). The proteolysis of trypsin inhibitors in legume seeds. CRC Critical Reviews in Biotechnology 8(3); 1988; 197-216

The seeds of plants often contain large amounts of proteins, which are subjected to extensive proteolytic processing during seed development and subsequent germination. One class of legume seed proteins, the Bowman-Birk-type trypsin inhibitors, has proved especially useful as a subject in studying these events. Sequence studies of the trypsin inhibitors from a number of legume sp. suggest that many of the inhibitors undergo a limited shoretining at the amino terminus during seed development. However, during germination, the inhibitors appear to function as storage proteins. As such, they are subjected to extensive proteolysis, ultimately leading to their destruction. This degradative process has been studied extensively in the mung bean (Vigna radiata (L) Wilczek). Proteolysis of the mung bean trypsin inhibitor involves, at least initially, an ordered sequence of limited proteolytic cleavages. The two proteases involved in the initial phases of this degradation have been identified and partially characterized. AS

Carob

1123 Saura-Calixto (F). Effect of condensed tannins in the analysis of dietary fiber in carob pods. Journal of Food Science 53(6); 1988; 1769-1771

Insoluble and soluble dietary fiber(IDF and SDF) determined gravimetrically from ripe carob pods after enzymatic treatments, were 32.6% and 6.8%, on dry matter basis. About 50% of the wt. of the DF residues corresponded to tannins and protein, because of protease inhibition, and protein-tannin complexes prevented the removal of these constituents in carobs. Nonstarch polysaccharides (14.7% dry wt.) and composition were determined by GLC analysis in acid hydrolysates of samples. The results were discussed showing that the content of DF obtained by enzymatic procedures, including the suggested AOAC method, may be overestimated because of the presence of condensed tannins. AS

Cowpeas

1124 Hung (YC), Chinnan (MS) and McWatters (KH). Effect of pre-decortication drying treatment on the textural quality of cowpea products. Seeds and akara. Journal of Food Science 53(6); 1988; 1778-1781

This study describes the influence of a pre-decortication drying treatment on the textural quality of cowpea seeds and akara (fried cowpea paste). Heat-treated seeds were more brittle than the unheated control, but there were no significant differences in seed britileness among drying temp. Akara from the 110 C treatment was less cohesive and requried more energy per unit mass to shear and compress than the other samples. Overall, the 50 Degre C, 70 C and 90 C treatments produced akara that compared favorably in textural quality to the control. Objective textrual parameters obtained from either TPA or the Kramer cell method correlated well with sensory measures of texture. AS

1125 Nnanna (IA) and Phillips (RD). Changes in oligosaccharide content, enzyme activities and dry matter during controlled germination of cowpeas (Vigna unguiculata). Journal of Food Science 53(6); 1988; 1782-1786

Cowpeas were germinated at 25, 30 and 35 C for 12, 24, 48 and 72 h. Stachyose disappeared after 48 h germination at 30 C while 85 and 95% reductions occurred at 35 C for 48 and 72 h. resp. Total oligosaccharide reduction was significantly greater at 30 C than at 25 C. Protease and amylase activities and rootlet development were minimal after 24 h germination but increased thereafter. Anerobic incubation was ineffective in furthering reduction of oligosaccharides in seeds germinated at 25 or at 30 C for 12 or 24 h. Total protein and carbohydrate contents were relatively unaffected. AS

Cowpea floor

1126 Abbey (BW) and Ibeh (GO). Functional properties of raw and heat processed cowpea (Vigna unguiculata Walp) flour. Journal of Food Science 53(6); 1988; 1775-1777, 1791

The functional properties, gelation, water and oil absorption, emulsification, foaming and protein solubility of raw and heat processed cowpea flour were determined. The effects of pH and NaCl concn. on some of these functional properties were also investigated. Protein solubility vs pH profile showed minimal solubility at pH 4 water and oil absorption capacities of raw flour were 2.4 g/g and 2.9 g/g resp., while heat processed flour gave 3.6 g/g and 3.2 g/g resp. Addition of NaCl up to 0.4% improved the emulsification capacity of raw flour while a decrease was observed in the heat processed flour after 0.2%. Least gelation concn. of raw floor was found to be 16% and heat processed flour, 18%. AS

Faba beans

1127 Zee (JA), Boudreau (A), Bourgeois (M) and Breton (R). Chemical composition and nutritional quality of faba bean (Vicia faba L. Minor) based tofu. Journal of Food Science 53(6); 1988; 1772-1774, 1781

Chemical composition and antinutritional factors in soy and faba beans and tofus produced thereof were evaluated. Both bean curds had higher protein contents (55.7 and 82.0% dry basis for soy and faba bean curds, resp.) than the corresponding raw beans. Tofu made from faba bean (FBT) contained only 1.5% total lipids (dry basis) compared to 34.4% in soybean tofu (SBT). Antinutritional and flatulence factors were much lower in FBT. Favism factors were not examined. In vitro studies showed that SBT and FBT are comparable in terms of digestibility and amino acid availability. AS

Greengram

1128 Pushpa Sree Gupta , Vimala (V), Geervani (P) and Yadagiri (B). Efficacy of vegetable oils as protectants of greengram stored in different jute bags. Journal of Food Science and Technology, India 25(4); 1988; 194-196

The present investigation was undertaken to find out the efficacy of coconut, gingelly, groundnut and safflower oils as prestorage treatments for greengram. Greengram samples were separately, coated with the above oils at 0.3 and 0.6% concn. and were stored in two types of bags (tightly knit and plastic lined jute bag) for six months. Though, there was a gradual increase in insect count, kernel damage, wt. loss and uric acid content as the period of storage increased, in general, greengram samples treated with oils showed better resistance to insect infestation than untreated samples. Among the four oils used, safflower oil at 0.6% level was found to be effective with insignificant level of infestation. Among the bags, plastic lined jute bag was found to give better protection than the tightly knit jute bag for storage. AS

Haricot beans

1129 Curl (CL Price (KR), Fenwick (GR). Isolation and structural elucidation of a new saponin (Soyasaponin V) from haricot bean (Phaseolus vulgaris L.). Journal of the Science of Food and Agriculture 43(1); 1988; 101-107

A new triterpenoid saponin has been isolated from haricot beans and its structure shown to be 3-O-[Beta-D-glucopyranosyl (1-2)-Beta-D-galactopyranosyl (1-2)-Beta-D-glucurono pyranosyl] olean-12-en-3Beta, 22Beta, 24-triol. The dietary intakes of saponins are discussed and the possible physiological consequences are identified. AS

1130 Kermasha (S), Alli (I) and Metche (M). Changes in peroxidase activity during the development and processing of Phaseolus vulgaris cv. haricot seed. Journal of Food Science 53(6); 1988; 1753-1755

Peroxidase activity was determined in haricot seed prior to germination, 5 days after germination, after 50 days of development and in the mature succulent green bean (80 days after germination). Specific activity of peroxidase, expressed as µ mole oxidized o-dianisidine/mg protein/min, was low (38.2) before germination; it increased substantially after 5 days of germination (90.1) and then increased dramatically with development (50 days, 189.7), followed by a decrease with time to maturity (55.0). Blanching treatment denatured peroxidase and this resulted in the immediate loss of 98% of its activity; 20% of the original enzyme activity was restored when blanched seed was stored for 12 months at -18 C. Peroxidase activity increased slightly in the unblanched seed after 12 months of freeze-storage at -18 C. Peroxidase activity was also regenerated dramatically when frozen seed was held at room temp. Freeze-drying inactivated peroxidase whereas air-drying showed limited inactivation of this enzyme. AS

Moth beans

1131 Pawar (VD) and Ingle (UM). Investigations on phytate-protein-minerals complexes in whey fractions of moth bean (Phaseolus aconitifolius Jacq) flour. Journal of Food Science and Technology, India 25(4); 1988; 190-193

Phytate, protein and minerals were determined from the whey fractions prepared from moth bean flour. The phytate-protein-minerals complexes were studied at pH 2.80, 6.40 and 8.40 . Moth bean flour contained 23.5% protein and 0.74% phytate. About 87.7% of total phytate was found in water soluble form. Phytate P represented about 61.7% of total P. Recovery of phytate in whey fraction I (pH 2,80), fraction II (pH 6.40) and fraction III (pH 8.40) was 12.3, 0.8 and 17.6%, resp. after 2 days dialysis. At pH 2.80, phytate protein complexes occurred as a result of strong electrostatic interaction and at pH 8.40, complexation between phytate and proteins was mediated by divalent cations such as Ca, Mg, Fe and Zn. The concn. of divalent cations were found higher in whey fraction III than I and II. AS

1132 Pawar (VD) and Ingle (UM). Functional properties of raw and cooked moth bean (Phaseolus aconitifolius Jacq) flours. Journal of Food Science and Technology, India 25(4); 1988; 186-189

Moth bean was cooked in an autoclave for 10, 15, 20, 25 and 30 min at 120 C and 0.705 kg/cm^2 pressure, (beans to water ratio was 1:4 wt/vol; beans were used as such), dried, ground and functional properties of flours were determined. Water and oil absorption capacity of flour were 2.4 g/g and 1.7 g/g, resp. Cooking of bean for 30 min increased water and oil absorption capacity of flour by 12.5 and 52.9% resp. Gelation was found more or less constant. N solubility vs pH profile showed only one min., at pH 4.5. Cooking lowered the N solubility at pH 2 to 12. The foaming capacity and emulsifying activity of bean flours were 27.0 and 20.2%, resp. Cooking for 30 min decreased the foaming capacity and emulsifying activity by about 48.1 and 31.0%, resp. AS

Pigeon peas

1133 Shepherd (H) and Bhardwaj (RK). Thin layer drying of pigeon pea. Journal of Food Science 53(6); 1988; 1813-1817

Semi-theoretical and empirical models were examined to test their applicability to describe the thin-layer drying characteristics of whole pigeon pea. The Page and single-term diffusion equations were found single and adequate for describing the drying behaviour of the grain. The diffusion model with several terms matched the observed data closely over the entire drying period. The drying parameters of pigeon pea were function of temp. and might be related by an Arrhenius-type equation. The drying behaviour of pigeon pea consisted of two periods and the drying rate plot was similar to that of other food grains. AS

Rice bean

1134 Priyamvada Verma and Urmil Mehta. Study of physical characteristics, sensory evaluation and the effect of sprouting, cooking and dehulling on the antinutritional factors of rice bean (Vigna umbellata). Journal of Food Science and Technology, India 25(4); 1988; 197-200

The study of physical characteristics showed that rice bean having more length and wt. had more edible portion as compared to mung bean. Sensory evaluation of cooked rice bean with and without sprouting was rated at par with cooked mung bean. Pressure cooking of rice bean at 15 lb for 20 min was more effective and time saving than open pan cooking. The effect of sprouting, cooking and dehulling on antinutritional factors revealed that on sprouting, the phytic P values for rice bean as well as mung bean decreased by 11.3 and 9.8%, resp. as compared to those of the whole ungerminated beans. The trypsin inhibitor activity of rice bean decreased by 44% on cooking and 30% on sprouting. The haemagglutinating activity in raw rice bean was 80 and steamed, sprouted and dehulled samples showed no residual haemagglutinating activity. Sprouting reduced the tannins in rice bean by 30.8% which were further reduced by 55% when sprouted rice bean was dehulled. AS

Snap beans

1135 Fernandez (CL), Rao (MA), Rajavasireddi (SP) and Sastry (SK). Particulate heat transfer to canned snap beans in a steritort. Journal of Food Process Engineering 10(3); 1988; 183-198

Convective heat transfer coeff. at the fluid-particle interface was determined for cut green beans in 303 x 406 cans processed in an agitated retort (FMC Steritort) by measuring the temp. of an aluminum bean and that of the surrounding Newtonian fluid. Four retort reel velocities, two sizes of aluminum beans, and six particle/fluid ratios were employed. Several correlation forms were tested. A correlation was developed in terms of the j-factor, Reynolds number (Re), and shape factor with an R^2 of 0.785. The particle's shape was a critical factor in the heat transfer . correlations. The fluid-particle heat transfer rate increased with an increase in rotational velocity of the retort. AS

OILSEEDS AND NUTS

1136 Ahmed (FA), Sharaf (A), Mahrous (TS) and El-Saadany (SS). Effect of kinetin (Plant growth regulator) on lipid composition of soybean and safflower. Crasas Y Aceites 39(4-5); 1988; 213-218

A field experiment was conducted to study the effect of kinetin growth regulator on the seed oil content, unsaponifiable matter and fatty acid composition of soybean and safflower plants. Four levels of kinetin (0, 10, 20 and 30 p.p.m.) were used. One soybean var. and three safflower cvs were treated. The oil content slightly changed according to kinetin treatments. The unsaponifiable matter revealed that the sterol fraction in soybean contained cholesterol, campesterol, stigmasterol, Beta-sitosterol, Delta^5 -avenasterol and Delta^7 -stigmasterol. Sterols increased by different treatments on the expense of hydrocarbons. Conversion and interconversion between sterol and hydrocarbons was observed. Fatty acids contained oleic, linoleic and linolenic as unsaturated fatty acids, palmitic and stearic acids as saturated. Pattern of fatty acids of soybean changed by different kinetin treatments, the saturated fatty acids increased on the expenses of unsaturated. Safflower cvs showed opposite trend whereas sterol fraction decreased and hydrocarbons increased, the unsaturated fatty acids increased on treatment with 20 and 30 p.p.m. kinetin on the expense of saturated. AS

1137 Bringi (NV). Progress in the chemistry and technology of non-traditional oilseeds/oils. (Lecture). Journal of the Oil Technologists" Association of India 20(1); 1988; 2-9

Recent developments in the chemistry and technology of a few selected non-traditional oilseeds and oils like sal (Shorea robusta), mourah, karanja (P. pinnata), kusum (S. oleosa (Lour.), and other lesser known oilseeds/oils are reviewed. KAR

1138 Notermans (S), Dufrenne (J) and Soentoro (PS). Detection of molds in nuts and spices. The mold colony count versus the enzyme linked immunosorbent assay (ELISA). Journal of Food Science 53(6); 1988; 1831-1833, 1843

The mold colony count method was compared with the mold-ELISA for enumeration of molds in nuts and spices. Mold counts were determined using three different enumeration media (dichloran-rose bengal medium, dichloran-glycerol medium and malt extract medium). The mold-ELISA was carried out with antibodies raised against the heat stable, water-soluble polysacharide antigens produced by molds. It was demonstrated that the reliability of the mold-ELISA could be enhanced by specific inhibition. For this inhibition specific sugar derivates, which neutralized the antibody activity, were added to presumptive positive test samples resulting in a negative ELISA reaction. It became clear that the mold colony count is a poor reflection oB the real state of mold presence in nuts and spices. AS

Coconuts

1139 Bakar (J), Hassan (MA) and Ahmed (A). Storage stability of coconut milk powder. Journal of the Science of Food and Agriculture 43(1); 1988; 95-100

Spray-dried coconut milk powder prepared with additions of skim milk and dextrin was stored in packages for 6 months at room temp. (30 C and 80% RH). The packaging materials used were aluminium laminate (vacuum and air packed) and polypropylene. The sorption isotherm of the powder showed that the monolayer of water mol. was complete when the relative humidity was 27% which corresponded to a moisture content of 5%. Measurements of water activity, moisture content, peroxide value and solubility index indicated that lipid oxidation is the limiting factor in the stability of the powder. Its max. shelf-life was 4 months when air or vacuum packaged in aluminium laminates and 1 1/2 months in polypropylene. AS

Groundnuts

Groundnut butter

1140 Resurreccion (AVA). Comparison of flavour quality of peanut based pastes and peanut butter by sensory methods. Journal of Food Science 53(6); 1988; 1827-1830

A bland flavoured and light coloured paste was developed to increase utilization peanuts. This study compared flavour quality of two pastes prepared from whole and chopped peanuts, water extracted to remove flour precursors, two commercial samples of peanut butter and a paste from raw peanuts (control). Cluster analysis was used to compare sensory scores of all samples. The premium brand peanut butter had the strongest roasted flavour while pastes had significantly more of the beany flavour than the peanut butters but less than that in the raw control. Chooping of kernels results in the loss of roasted and sweet flavours and the introduction of cardboard, musty and metallic flavours. AS

Linseeds

Linseed proteins

1141 Dev (DK) and Quensel (E). Preparation and functional properties of linseed protein products containing differing levels of mucilage. Journal of Food Science 53(6); 1988; 1834-1837, 1857

The functionality of two-high mucilage protein conc.(HMPC) prepared from linseed and linseed expeller cake by extracting and coprecipitaing the mucilage with protein was compared with those of a low-mucilage flour (LMF), a protein conc.(LMPC), and a protein isolate (LMPI) in simple systems. The HMPC samples had better water absorption and emulsifying properties, higher foaming capacity, but lower N solubility, oil absorption, and foam stability than LMF and LMPC. They also registered higher values of viscosity and emulsification characteristics than LMPI. AS

Rapeseeds

1142 Heaney (RK), Ann Spinks (E) and Roger Fenwick (G). Improved method for the determination of the total glucosinolate content of rapeseed by determination of enzymatically released glucose. Analyst 113(10); 1988; 1515-1517

A method is described for the detn. of the total glucosinolate content of rapeseed. The method is an improvement of a previously described procedure and avoids the necessity for a defatting step. The new and old methods are compared with each other and with a high-performance liquid chromatographic method. AS

1143 Schnug (VE) and Haneklaus (S). Changes in the total glucosinolate content in rapeseed during maturation analyzed by glucose, HPLC, H-1 (sulphatase) and X-RF method. FAT Science and Technology 90(9); 1988; 329-331 (De).

Investigation on quantification of total glucosinolate in rapeseed during maturation has been carried out using different analytical methods. Results show a continuous increase in glucosinolate content up till harvesting. MNK

Rapeseed meal

1144 Veenu (SK) and Garg (SK). Studies on nutritional quality of treated rapeseed meal. Journal of the Oil Technologists" Association of India 20(2); 1988; 42-44

Rapeseed meal (i) heated, (ii) methionine supplemented, (iii) casein supplemented and (iv) dehulled were fed to albino rats to provide 10% of dietary protein and the protein efficiency ratio (PER) food efficiency (FE), protein utilization (PU), food utilization (FU) and net protein retention (NPR) were determined. Of all the combinations only (ii) proved best and its PER, PE and NPR were higher than (ii) - (iv). The protein quality of RSM was also improved when casein was supplemented. The overall order for the quality assessment of RSM diets can be represented as (ii) > (iii) > (i) > control > (iv). KAR

Rapeseed proteins

1145 Schwenke (KD), Augustat (D) and Wagenknecht (W). Binding of cellulose sulphates to the 12 globulin and the low molecular mass basic protein fraction from rapeseed in insoluble complexes. Nahrung 32(4); 1988; 393-407

The binding of two differently substituted cellulose sulphates (CS) with DS 0.50 and 0.33 to two main rapeseed proteins, the high mol. mass neutral 12 S globulin and the low mol. mass basic protein fraction ("albumin") in insoluble complexes at pH < Pi (protein) has been studied using turbidimetric titration and chemical analysis of the supernatant after coprecipitation. The binding of both types of CS to the globulin at pH 3.0-2.5 at the precipitation occurs at a substoichiometric CS-protein mass ratio. This result has been obtained both by turbidimetric titration and chemical analysis. Contrary to that, the CS binding to the albumin is substoichiometric according to the turbidimetric titration and stoichiometric according to the chemical analysis. The CS-protein mass ratio in the coprecipitates obtained of pH 2.5 and 3.0 is nearly independent on the CS concn applied for the precipitation of the albumin. There is a typical dependence on the CS concn, however, for the globulin at pH 3.0, which becomes less pronounced at pH 2.5. The CS-globulin complexes form sharp turbidimetric titration curves at pH < Pi (pH 2.5-5.5), the max. position of which shifts to lower pH with increasing percentage of CS. The analogous titration curves for the CS-albumin complexes are broader, owing to the heterogeneity of the albumin fraction. Both polyanions exert a solubilizing effect at a molar excess on both proteins. Regarding the wt. part necessary for precipitation ($W_{insol.}$), forming stoichiometric complexes ($W_{stoichm.}$) and solubilization (W_{i}) of the proteins, the following range can be written: $W_{insol.}$ < W_{i} < W[illegible] . AS

Soybeans

1146 Chow (ETS), Wei (LS), Devor (RE) and Steinberg (MP). Performance of ingredients in a soybean whipped topping. A response surface analysis. Journal of Food Science 53(6); 1988; 1761-1765

The performance of Illinois Soybean Beverage in a whipped topping model system was demonstrated by using Response Surface Methodology. The desired foam characteristics were obtained with numerous ingredient combinations. The soybean cell wall materials were functionally similar to CMC-coated microcrystalline cellulose and significantly improved whipped topping stability. Partial removal of the cell wall particles to 0.3% improved overrun and stiffness, yet maintained satisfactory stability. These particles were compared with a Nicel and soy fiber concentrate the results indicated that the larger the particles, the less their effect on overrun and stiffness. AS

1147 Taira (H), Torium (H) and Saitom (M). Effect of seeding time and cultivar on total carotenoids content and colour of soybean seeds. Quality of soybean seeds grown in Japan. Part XVI. Journal of Japanese Society of Food Science and Technology '(Nippon Shokuhin Kogyo Gakkaishi') 35(10); 1988; 697-705 (Ja).

In order to evaluate the effect of seeding time and cvs on the total carotenoids content and colour of soybean seeds, 8 cvs grown at intervals of 20 days on 5 seeding times from May 9 to July 28 in 1975 were examined. The later the seeding time was, the higher the total carotenoids content, colour values of X and Y of soybean flour and y of defatted soybean flour were observed. Compared with first culture, the last culture was 1.1 to 2.7 times in total carotenoids content. On the total carotenoids content and colour value, significant differences were observed among the cvs except X colour value of defatted soybean flour and among seeding times except Y % colour value of soybean flour. From the contribution ratio of seeding time and cvs total carotenoids content and colour values of soybean flour (except Y % value) and of defatted soybean flour were highly affected by seeding time. As to the total carotenoids content and colour, sum total of days of seeding to flowering, seeding to maturity, and flowering to maturity, and accumulated daily mean temp. during ripening correlated negatively with total carotenoids content and X and Y values of soybean flour colour and with Y value of defatted flour colour. Total carotenoids content correlated positively with X and Y values of soybean flour colour and with Y value of defatted flour colour. In the colour of both flours, Y % value correlated negatively with X value. AS

1148 Yoshida (H) and Kajimoto (G). Effects of microwave treatment on the trypsin inhibitor and molecular species of triglycerides in soybeans. Journal of Food Science 53(6); 1988; 1756-1760

Whole soybeans at different moistures (8.6, 24.3, and 49.7%) were heated by exposure to microwaves at frequency of 2, 450 MHz. The trypsin inhibitor in soybeans at 24.3% moisture, soaked for 1 h was completely inactivated after treatment for 4 min, which was shorter than the heating period (6 min) needed for unsoaked soybeans. However, the trypsin inhibitor in soybeans at 49.7% moisture, soaked for 5 h was not completely inactivated even after heating for 12 min. The loss of molecular sp. of soybean triglycerides containing more than four double bonds in a triglyceride was less for soaked soybeans than for soybeans before soaking (8.6% moisture). AS

Soy proteins

1149 Ashraf (H-RL) and Lee (H-R). Effects of soy hull flour on soy proteins emulsions. Journal of Food Science 53(6); 1988; 1766-1768

Soy hull flour (SHF) was added to a soy protein solution (100 mg/50 ML D.W.) to determine the effects of the SHF on the characteristics of the soy protein emulsion. A greater amount of oil was emulsified in the presence of SHF at pHs above 4.5. The amount of oil emulsified increased sharply with addition of up to 5g SHF. Emulsion capacity of total protein in the system decreased with addition of SHF. Viscosity increased drastically at alkaline pH at constant level of SHF. Stability increased slowly up to 5g addition then decreased rapidly. Stability was improved with the inclusion of SHF at pHs above 4.5. AS

1150 Salama (NA). Evaluation of potato-egg patties extended with different soy proteins. Crasas Y Aceites 39(4-5); 1988; 210-212

Potato patties containing 10% whole egg were extended with four different soy proteins (30% replacement of potato) full fat soy, defatted soy flour, concentrated and isolated soy proteins. Incorporation of soy products in patties increased the protein and ash content, while decreased carbohydrate per cent. Adding full fat soy raised lipids per cent in patties. In general, calcium and phosphorus increased, but magnesium and pottasium decreased in potato-egg patties by soy additives. Extending of potato-egg patties with full fat soy or isolated soy proteins improved general acceptability scores. Soy protein supplementation improved the biological value and the protein efficiency ratio of the patties. AS

TUBERS AND VEGETABLES

1151 Cooke (RD), Rickard (JE) and Thompson (AK). The storage of tropical root and tuber crops-cassava, yam and edible aroids. Experimental Agriculture 24(4); 1988; 457-470

This paper reviews recent advances in storage research for three principal root corps: cassava, yam, and the edible aroids. Aspects covered include botany post-harvest-characteristics (physiology/biochemistry/pathology) and storage techniques (low-cost methods, higher cost techniques-refrigeration). 86 references. BV.

Root vegetables

Brassica

1152 Poonam Aggarwal) and Saini (SPS). A comparative study on physico-chemical composition of leaves and stems of new Brassica varieties. Indian Food Packer 43(1); 1989; 21-24

Brassica var. Toria-ITSA, (Br. campestris), Brown sarson, (Br. campestris), Chinese cabbage (Br. perkinensis), RLN-240 (Br. juncea), and Gobhi sarson (Br. napus) were studied for physico-chemical characters. Chlorophyll and ascorbic acid in the mustard var. varied from 38 to 65 mg/100 g and 48 to 136.32 mg/100 resp. Min. ascorbic acid and chlorophyll content was found in Chinese cabbage var. whereas high chlorophyll content was found in Brown sarson and RLM-240 var. (65 mg/100 g and 52 mg/100 g). All the var. had smooth leaves and stalks except RLM-240 which had rough and hairy leaves. VKR

Cassava

1153 Darnoko Artz (WE). Twin-screw extrusion as a continuous pretreatment process for the enzymatic hydrolysis of cassava. Journal of Food Science 53(6); 1988; 1792-1794, 1799

Twin-screw extrusion was evaluated as a pretreatment for the enzymatic hydrolysis of cassava starch to glucose. Extrusion temp. and pH affected the key parameters associated with the enzymatic hydrolysis of starch such as the water solubility index, the water absorption index, the apparent viscosity, and the susceptibility of the extruded starch to glucoamylase. The glucose concn. of extruded and enzyme-hydrolyzed cassava starch was approx. 5% greater than that of acid-liquefied and enzyme-hydrolyzed cassava starch. AS

1154 Ghildyal (NP), Kunhi (AAM), Lonsane (BK) and Ahmed (SY). Conversion of cassava fibrous waste residue into ethanol by acid-enzyme process. Indian Food Packer 43(1); 1988; 5-11

Saccharified waste material collected from the cassava processing industry containing about 7% reducing sugar was utilized for the production of ethanol using Saccharomyces cerevisiae FT-18. Acid-enzyme saccharification was estimated by enriching with various mineral salts as well as providing N from various sources. Alcohol formed was max. when urea, magnesium sulphate, potassium hydrogen phosphate and sodium sulphate was used as mineral salt enrichment and when ammonium phosphate was used as N source. Increasing the sugar concn. from 7% to 15.98% increased the per cent alcohol formed from 2.31 to 4.92% (w/w) and the fermentation efficiency increased to 75%.--.It is suggested that in this type of fermentation the slurry concn. of the waste during hydrolysis should be raised to 15% reducing sugars in the hydrolysate. KAR

Horseradish

1155 Kojima (M), Yanaga (K-I), Hamada (H) and Kashige (N). Changes of the concentrations of volatile sulphur compounds caused by drying of horseradish roots. Journal of Japanese Society of Food Science and Technology '(Nippon Shokuhin Kogyo Gakkaishi') 35(10); 1988; 713-716

Horseradish roots were cut off into chips and they were dehydrated under airing at low temp. or freeze drying. Volatile sulphur compounds in the hydrolysates of fresh and fried materials were investigated by gas chromatography equipped with FPD. (1) The following 7 isothiocyanates were detected in the hdyrolysates of experimental materisls: iso-propyl, sec-butly, allyl, 3-butenyl, 4-pentenyl, 3-methylthiopropyl, and Beta-phenethyl isothiocyanates. Three unknown volatile sulphur compounds were also detected. In fresh materials the peak are (%) of allyl isothiocyanate to that of internal standard, phenyl isothiocyanate, was the highest, followed by Beta-phenethyl and 3-butenyl isothiocyanates. (2) By drying the material the peak areas (%) of sec-butyl and 3-butenyl isothiocyanates increased, whereas the peak area (%) of Beta-phenethyl isothiocyanate fairly decreased. AS

Tubers

Potatoes

1156 Beerh (OP), Manan (JK), Joshi (GJ) and Berry (SK). Effect of climate, variety and post cold storage conditioning of potatoes on the quality of potato wafers. Indian Food Packer 42(5); 1988; 53-61

The quality of potato wafers made from potato var. (`K. Sherpa', `K. Dewa', `J. Joyti', `K. Badshah', `K. Sindhuri', `K. Chandermukhi', `K. Bahar', `K. Lauvkar', `K. Lalima' and `Phulwa' grown in Punjab plains and hills of Himachal Pradesh) after short (2 months) and long spells of cold storage (6 months for var from plains and 3 months for var. from hills) (32-35 F) followed by conditioning at room temp. for varying periods was determined. The yield of wafers was max in case of K. Dewa (31-2%) in potatoes from plains and K. Sherpa in potatoes from hills. Wafers of all the var. except K. Sherpa grown in plains exhibited brown discolouration to varying degree immediately after withdrawal from cold storage when sugar contents in var. varied from 1.6 to 6%. Discolouration of wafers in most of the var. was reduced during progressive conditioning and totally eliminated in var. K. Sherpa and K. Dewa. Among all the var. tested wafers from K. Dewa was adjudged best followed by K. Sherpa and Phulwa. KAR

1157 Hus (AF), Thomas (CE) and Brauer (D). Evaluation of several methods for estimation of the total activity of potato polyphenol oxidase. Journal of Food Science 53(6); 1988; 1743-1745

Several methods of preparing homogenates from potato tuber for estimating the total activity of polyphenol oxidase (PPO) were compared. To remove endogenous phenols that may inhibit PPO, homogenates were either treated with polyvinylpyrrolidone (PVPP) or subjected to extensive dialysis, ammonium sulphate or acetone precipitation or Sephadex G-25 chromatography. The G-25 gel filtration method was superior in removing phenolic compounds and in retaining PPO activity. Using this chromatographic method, the tubers of `Rusett', `Burbank' cvs were found to contain highest PPO activity followed by `Russett' and then `Atlantic' cvs. AS

1158 Kaul (HN) and Ashiva Mehta. Evaluation of passive evaporative cooling for storage of potato (Solanum tuberosum). Indian Journal of Agricultural Sciences 58(12); 1988; 928-931

Two storage structures of 20 t capacity each, constructed on the principle of passive evaporative cooling, were evaluated in 1985 and 1986. Max. temp. inside the stores remained 6-13 C lower than the ambient during March-June, with high R.H. (76.5-94.0%) `Kufri Chandramukhi' and `Kufri Lauvkar' potato (Solanum tuberosum Linn). showed 100% sprouting after 6 wk. of storage, whereas `Kufri Badshah' and `Kufri Sindhuri' showed after 8 and 10 wk of storage resp. Loss in total wt. of potato in the store was 9.4-11.6% compared with 3.6-4.1% in cold storage. Total loss in wt. of potato (14.0-17.4%) kept in boxes in the experimental stores was higher than the loss in wt. of potato (11.7%) stored in bags. Market value of potato (Rs. 113/q) stored in the experimental stores was not much different than that stored in cold storage (Rs. 114/q) up to 10 wk. Potato could be stored in such structures till June, when the market prices are on increase. AS

1159 Mondy (NI) and Munshi (CB). Effect of molybdenum fertilization on the nitrogenous constituents of potatoes. Journal of Food Science 53(6); 1988; 1909-1910

The effect of molybdenum fertilizer on the Nous constituents of Katahdin potatoes was investigated. The chemical constituents studied were total N, nonprotein N, and protein. Sodium molybdate was applied to the soil at rates of 0.0, 2.8, 6.7 and 10.1 kg/ha during the first yr. and 0.0, 5.6, 16.8 and 22.4 kg/ha during the second yr. of the study. The compound was applied to the soil one day prior to planting of the seed potatoes. During both yr.s of the study, tubers from plants receiving molybdenum fertilization were significantly higher ($P < 0.01$) than the controls in total N and protein and significantly lower ($P < 0.01$) in nonprotein N at all levels of molybdenum application. Greatest increase in total nitrogen and protein were observed in tubers from plants receiving 22.4 kg/ha sodium molybdate. AS

Potato chips

1160 Grewal (SS) and Uppal (DS). Effect of dry matter and specific gravity on yield, colour and oil content of potato chips. Indian Food Packer 43(1); 1989; 17-20

The dry matter, chip yield and sugar content of potato var. were determined. The chip yield ranged between 141 and 185 g/kg potato and was directly proportional to the dry matter and starch content of the potato. Reducing sugars varied between 230 and 520 mg/100 g fresh wt., and all the var. except `Kufri Chamatkar' gave the acceptable chip colour; chip yield increased linearly from a sp. gr. of 1.0599 through 1.0782. The chip oil content decreased considerably with increase in sp. gr.; potato tubers of high sp. gr. gave chips with superior colour (> 60 L value). VKR

Vegetables

1161 Ramanuja (MN), Vibhakara (HS) and Jayaraman (KS). Studies on the occurrence, partial purification and effect of heating on peroxidase in some vegetables. Journal of Food Science and Technology, India 25(4); 1988; 201-204

Peroxidase activity was assayed in fifteen vegetables. The concn. of enzyme in vegetables was compared on wet and dry wt. basis and found to vary widely among them. Studies on partial purification of the enzyme from some vegetables showed that acetone precipitation gave better recovery and higher fold purification and ammonium sulphate. Rate of loss of activity of the enzyme with heating was studied using the acetone precipitate and the activity-time curves obtained at different temp. in the range of 60-100 C, `D' and `Z' values were established from the curves. Among the vegetables studied, the enzyme from lobia and cluster beans was found to have higher heat resistance than others. AS

1162 Swiderski (F), Trezeciecki (M), Przeslakiewicz (H) and Chustecki (P). Comparison of functional properties of selected vegetable hydrocolloids and emulsifiers. Flussiges Obst 56(2); 1988; 63-64

Leafy vegetables

Alfalfa

1163 Hernandez (A), Gonzalez (G) and Martinez (C). Solvent extraction of alfalfa chloroplastic curds. Journal of the Science of Food and Agriculture 43(1); 1988; 67-73

The effect of pH during the preparation of chloroplastic curds upon the extraction of their lipids and their discoloration were studied. The chloroplastic curds were produced by means of a heat treatment, after adjusting the pH of the juice. Four pH values (6.0, 8.0, 8.5, 9.0) and three solvents (acetone, chloroform/methanol 2:1, propan-2-ol) were evaluated. The extractions were performed in a Soxhlet apparatus and carried out on freshly prepared curds. In the extracted and non-extracted products, Kjeldahl N and the colour parameters a, b and L (Hunter Colour Difference method) were determined. The largest amount of lipids was extracted from the curds obtained at pH 6.0; this was associated with an increase in the N content of the concentrate arising from lipid removal. The curds obtained under alkaline conditions yielded increasing amounts of lipid with increasing pH. In all cases a slight decrease in the N content was noticed in the extracted curd compared with the non-extracted curd. The colour of the extracted products depended both on the pH employed during curd preparation and on the solvent used for the extraction. AS

Spinach

1164 Gonzalez (AR), Davis (DR), Kattan (AA), Elkins (ER) and Kim (ES). Effect of leaf type, leaf injury, storage temperature and washing solution on ethylene thiourea residues of carbamate-treated canned spinach. Journal of Food Safety 9(3); 1989; 155-164

The ethylene thiourea residue originating from ethylenebisdithiocarbamate fungicide sprayed in the field was evaluated in canned spinach. The effect of leaf type, mechanical injury, holding temp. and washing solution on levels of ETU were studied. A smooth leaf cvs. had lower ETU residues than savoy and semi savoy. Leaf injured spinach had higher ETU residues than the intact control. Spinach washed in water reduced the ETU level to less than 5 p.p.m., while addition of sodium hypochlorite (300 p.p.m.) and a basic detergent (0.1%) further reduced ETU levels to less than 1 p.p.m. KMA

Pumpkins

1165 Sukhvir Kour Teotia (MS), Berry (SK). Sorption behaviour of pumpkin (Cucurbita moschata) seeds and kernels. Indian Food Packer 43(1); 1989; 25-28

A commercial sample of pumpkin seed on analysis showed high content of fat (35.40%) and protein (29.50%). Equilibrium relative humidity of pumpkin seeds and kernels was 57 and 54% at moisture contents of 5.73 and 3.98% resp., at room temp. (30 plus or minus 5 C). The seeds and kernels stored well when the moisture content was maintained < 7% and 5% resp. corresponding to 70% RH. VKR

Tomatoes

1166 Wells (JH) and Paul Singh (R). A kinetic approach to food quality prediction using full-history time-temperature indicators. Journal of Food Science 53(6); 1988; 1866-1871, 1893

A mathematical model based on the theory of chemical kinetics was derived to predict food quality change from the response of a full history time-temp. indicator. A first-order kinetic reaction (n=1) was used to describe both indicator response and changes in food quality. A storage investigation of mature green tomatoes showed that the quality prediction model satisfactoriy predicted changes in tomato firmness induced by variable temp. storage. Tomato firmness as predicted from the response of a LifeLines model 57 time-temp. indicator was not significantly different from the observed changes (F=1.99, P=0.18) for 28 days of storage. The mathematical derivation was extended to develop a quality-based interpretation of the shelf life of perishable foods. AS

FRUITS

1167 Heil (JR), McCarthy (MJ) and Merson (RL). Influence of gluconic acid on enzyme inactivation and colour retention in canned apricots and peaches. Journal of Food Science 53(6); 1988; 1717-1719

Apricots, clingstone and freestone peaches packed in tin-free steel cans with up to 1.1% gluconic acid in the syrup retained better colour than fruits packed without the acidulant. Up to 0.44% by wt. gluconic acid did not affect heat resistance of peroxidase/polyphenoloxidase enzyme systems in apricots. Requirements for heat inactivation of enzymes increased with fruit maturity, from F_{100} = 1.3 ,min with Z = 16 C in canning ripe, to F_{100} = 7 min with Z = 61.5 C in soft ripe apricots. Enzyme regeneration occurred within 48 h . Methods tested for measuring enzyme activity are discussed. AS

1168 Kunzek (H), Heilscher (K) and Leps (C). About the determination of the swelling number of dry fruit and vegetable products. Lebensmittelindustrie 35(2); 1988; 83-87 (De).

The swelling number of selected dried fruit and vegetable products has been determined by different method. A unique dependence of the results appeared as well on the sort of the products used as on the test conditions of the applied method. The swelling number is influenced by temp. time and different external conditions of exhaustion, particularly. The precision to be attained is good up to satisfying as a rule. AS

1169 Philip (T) and Chen (T-S). Development of a method for the quantitative estimation of provitamin A carotenoids in some fruits. Journal of Food Science 53(6); 1988; 1703-1706

A procedure for the quantitative estimation of provitamin A carotenoids beta-carotene, cryptoxanthin and cryptoxanthin esters in some fruits using conventional column and high performance liquid chromatography was developed. The provitamin A carotenoids were first separated by column chromatography on alumina prior to further separation and quantitation by reversed phase liquid chromatography. The distribution of provitamin A carotenoids in fruits varied. Among the provitamin A rich fruits, apricot, mango, and cantaloupe contained essentially beta-carotene whereas cryptoxanthin accounted for nearly half the total carotenoids in papaya, persimmon, and tangerine. Peach, red bell papper, oranges and red grapefruits were intermediate in their provitamin A content while tomato, yellow bell pepper, pineapple and watermelon were poor sources. Cryptoxanthin occurred acylated with C_8 to C_{18} saturated fatty acids in the fruits analyzed. AS

1170 Wills (RBH), Lim (JSK) and Greenfield (H). Composition of Australian Foods. 42. Canned fruits. Food Technology in Australia 40(6); 1988; 223-227

This paper reports on the nutrient composition of canned pears, peaches, apricots, pineapples and fruit salad canned in Australia and available in retail outlest in Sydney in 1984 and these values have been compared with those reported for fresh fruit. After determining the drain wt. of the cans the composite samples of fruit and liquid have been analysed separately with aliquts analysed immediately for vitamin C and water. The remaining samples were stored at -18 C until analysed for protein (%N x 6.25), Fat, sugars and sorbitol, starch, fibre, organic acids, ash, potassium, sodium, calcium, magnesium, iron, zinc, vitamin B1, B2, niacin and carotenoids. The energy was calcultated and analytical methods followed were according to standard methods. The results showed that most of the nutrients did not differ greatly between fruit and juice fractions with the exception of dietary fibre and the carotenoids which remained mostly in the fruit. The proximate composition of products canned in pear or pineapple juice was similar to that of fresh fruit. The levels of vitamins, minerals in all products were found to be less than in fresh fruit due to the diluting effect of the canning liquid. The nutrient composition has been updated by this study. NGKR

Apples

1171 Bundschuh (E), Baumann (G) and Gierschner (K). Investigations of the isolation of flavour compounds from apple peels by carbon dioxide high pressure extraction. Deutsche Lebensmittel-Rundschau 84(7); 1988; 205-210 (De).

The isolation of flavour compounds from apple peels succeeds with the fractionation of the extract in an w[illegible]nd a flavour fraction. Therefore a new separation process was developed, which allows a fractionation in only one separator and not as usually in two different separators. Considering the issues of aroma oil yield and process costs the optimum extraction parameters are 70 bar and 25 C. The comparison with a standard method showed, that at these conditions aroma oil was totally extracted. 1.5 g/kg intense smelling aroma oil, a solution of aroma compounds in lipids, was yielded from "Jonagold" apples. The extract yield as a function of solvent flow was determined and gas loading and solvent consumption calculated. Furthermore the interpretation of the extraction curves leads to the hypothesis, that in the cell flavour compounds are associated with membrane lipids. AS

1172 Drake (SR), Moffitt (HR), Fellman (JK) and Sell (CR). Apple quality as influenced by fumigation with methyl bromide. Journal of Food Science 53(6); 1988; 1710-1712, 1736

The use of methyl bromide (MeBr) did not detract from the firmness or skin colour of "Delicious" "Golden Delicious" or "Granny Smith" apples. Fruit fumigation with MeBr resulted in a darkening of the objective and subjective internal flesh colour of "Delicious" apples, particularly unwaxed apples treated with 48 g MeBr/m^3 at 20 C for 2 h. Internal flesh colour of "Golden Delicious" apples was not influenced at 48g MeBr/m^3 at 6 C for 2h. Fumigation with 32g MeBr/m^3 at 20 C or 56g MeBr/m^3 at 6 C for 2 h did not detract from the firmness or internal colour quality of "Delicious", "Golden Delicious" or "Granny Smith" apples after 60 days in storage. MeBr-treated apples displayed greater acidity and less ethylene production than control fruit. Higher MeBr treatment temp. and the use of wax on fruit directly influenced the reaction of apples to MeBr fumigation. AS

1173 Harrison (MA). Presence and stability of patulin in apple products. A review. Journal of Food Safety 9(3); 1989; 147-153

Patulin is a toxic metabolite of several sp. of Penicillium, Aspergillus and Byssochlamys. Patulin contamination of apple cider can occur if apples supporting patulin producing molds are included in the starting material during cider production. Reduction of patulin in apple juice during storage was reported. Patulin was stable in acidic pH. Patulin heated in aqueous solution (pH 3.5) to 125 C and held for 268 min. There was 90% reduction in its content. Disappearance of patulin from apple juice due to fermentation by Saccharomyces spp. Trimming patulin containing tissues from apples decreased toxin level. Patulin reacts with sulphydral groups present in foods and disappears. KMA

1174 Krishna Prakash (MS), Narasimham (P), Dhanaraj (S), Aravinda Prasad (B), Krishna Prasad (CA), Habibunnisa and Ananthakrishna (SM). Studies on maturation of apples. Effect of seasonal variation on physico-chemical parameters and their correlations. Journal of Food Science and Technology, India 25(4); 1988; 205-210

Growth and maturation pattern of four cvs of delicious apples grown in Himachal Pradesh were studied for seasonal variations during four consecutive yrs. All the physico-chemical maturity parameters employed showed clear changes during the maturation period and seasonal variations. Among them, the disappearance of starch pattern index of 4.0 and browning of seeds with a seed colour index of 6.0 together clearly define optimum harvest maturity. Making use of them, limits for optimum harvest maturity as affected by seasonal variations were determined for diameter, wt., total soluble solids, acidity and MT puncture values. All the maturity parameters considered showed highly significant linear correlation among one another. Apples harvested at optimum maturity showed good quality and storage life. The methodology will be useful as a quality control-measure of fresh produce and in the study of seasonal, varietal and regional differences in apple quality. AS

1175 Sen (NP) and Baddoo (PA). An investigation on the possible presence of morpholine and N-nitrosomorpholine in wax-coated apples. Journal of Food Safety 9(3); 1989; 183-191

Fairly high levels (1.1 to 3.85%) of morpholines(MOR) and traces. (140 to 670 p.p.b.) of N-nitrosomorpholine(NMOR) were detected in 9 commercial samples of liquid waxes used for coating apples. Low levels of (0.25 to 7.7. p.p.m.) MOR but not NMOR were detected in 17 batches of apples coated with these waxes. KMA

1176 Van Woensel (G), Verdonck (E) and De Baerdemaeker (J). Measuring the mechanical properties of apple tissue using model analysis. Journal of Food Process Engineering 10(3); 1988; 151-163

Along with the grade of intactness, fruit firmness is an important factor for the quality criteria on which the consumers acceptance for apple is based. Two methods for measuring the fruit firmness (a destructive one and a nondestructive one) are compared. The nondestructive method was model analysis to define the lower vibration modes. This enables the use of the 3-media elastic sphere model developed by Cooke and Rand (1973) to calculate the dynamic elastic moduli of the whole apples. The destructive method determines the dynamic elastic moduli cylindrical samples of apple tissue. This method is based on the vibration characteristics of a mass-spring-damper system. This system consists of a cylindrical apple sample and a mass. Measuring the direct transfer function of this one-degree-of-freedom system results in values of its system parameters, from which the dynamic elastic moduli of the specimen can be calculated. The results of the two methods applied on `Golden Delicious' apples were compared, and the suitability of each model was evaluated. AS

Apple slices

1177 Santerre (CR), Cash (JN) and Vannorman (DJ). Ascorbic acid/citric acid combinations in the processing of frozen apple slices. Journal of Food Science 53(6); 1988; 1713-1716, 1736

Sulphate replacement was investigated in a commercial apple freezing operation . Jonathan and Spy apple slices were vacuum-impregnated in 0.5% or 1% ascorbic acid (LAA) or D-araboascorbic acid (DAA), 0.25% or 0.5% citric acid (CA), 2% NaCl, and 0.25% CaCl. Treatments with DAA gave colour and sensory properties equal to LAA treatments. Slice colour was not significantly different between 0.5% and 1.0% ascorbic acid isomers and 0.25% or 0.5% CA. Shear measurements of Jonathan slices were significantly influenced by DAA and citric acid concn. Texture of Spy slices was not affected by treatment or storage. This study indicates that DAA may be substituted for more expensive LAA for treating Spy and Jonathan slices prior to freezing. AS

Apricots

1178 Guichard (E). Quantification of some volatile aromatic compounds of apricot by adding standards. Journal of Food Science 53(6); 1988; 1902-1904

Bananas

1179 Ramana (SV), Mohan Kumar (BL) and Jayaraman (KS). Effect of post-harvest treatment and modified atmosphere on the storage life of fresh banana and guava under ambient temperature. Indian Food Packer 43(1); 1989; 29-35

Banana and guava fruits were stored at ambient temp. (19-30 C) either after dipping in 5% calcium chloride solution for 15 min. or in a continuously flushed atm. They were also packed in polythene bag (300 gauge) containing ethylene absorbent sachet. By continuously flushing the storage atm. with air saturated with moisture, and by creating ethylene free atm., it is possible to ensure less wt. loss and slower changes in firmness and brix/acid ratio and extend the storage life of banana upto 8 days at 19-30 C as compared to 3 days for control and that of guava for 10 days as compared to 5 days for control. KAR

Ber

1180 Tripathi (VK), Jain (SP) and Surjeet Singh. Physico-chemical composition of some ber cultivars (Zizyphus mauritiana L.). Indian Food Packer 43(1); 1989; 12-16

Ber Zizyphus mauritiana L.) var. (Godhan, Karaka, Delhi Gola, Pewandi, Badshah pasand, Jogia, Balam Khera) were analysed for physico-chemical characteristics. Karaka var. showed that max. fruit wt. (17.43 g/fruit), girth (8.99 cm), sp. gr. (1.08) and (8.45%) non-reducing sugar content. Badshah Pasand contained max. amount of total soluble solids(18 Brix) and protein (0.22 mg/g) whereas the fruit pulp of Jogia var. contained highest amounts of acidity (8.41 mg/g), ascorbic acid (48.6 mg/100 g) reducing sugar (9.81%) and total sugar (12.93%). VKR

Carambola

1181 Bhattacharyya (AK), Roy (GC) and Mazumdar (BC). De-greening of carambola fruits by steeping fruits with brine water. Science and Culture 54(11); 1988; 373-375

Carambola (Averrhoa carambola L.) fruits were steeped in salt solutions (NaCl) of 1, 4, 8, 12, 16, and 20 and 24% w/v concn. for 3 h and the qualitative changes were examined. Soaking in salt solution degreened the fruits rendering loss in the constituents of their qualitative value. Degreened fruits assumed whitish appearance which usually do not have greater acceptance in the market. Steeping in brine water of > 8% level could never be advocated if the soaking continued upto 3 h, because such treatment wilted the fruits starting from the ribs and gradually extending upto the core of the fruits; the fruits also turned soft within a day. KAR

Citrus fruits

1182 Ikotun (T), Faboya (O) and Umoh (SO). Oxalic acid content of healthy and infected citrus fruits in Nigeria. Nahrung 32(4); 1988; 335-341

The oxalic acid content of the fresh juice of some healthy citrus fruits in Nigeria is very low (0.012%). Whereas in the juice of fruits infected with Aspergillus aculeatus, oxalic-acid content increased to 0.028%, the oxalic-acid content of the juice infected with A. tamarii was lower (0.008%) than in healthy fruits. However, the oxalic acid content of citrus-fruit pulp was much higher than in the juice and was much higher in the infected (0.68%) than in the pulps of healthy citrus fruit (0.11%). The oxalic-acid content of fruits pulps infected with A. aculeatus was consistently the highest. The oxalic acid content of the rind of healthy fruits (0.10%) was low (though higher than in the juice) but in the infected fruits, the oxalic-acid content of the rind was much higher, being highest again in those infected with A. aculeatus (0.65%). The effects of oxalic acid on man, animal, plants and some of its uses in medicine and industry are discussed. AS

Dates

1183 Ali (KT) and Sidahmed (OA). Physico-chemical evaluation of fruits of some Sudanese date cultivars. Tropical Agriculture 65(2); 1988; 117-124

Fruit samples of 12 date cvs were collected at the beginning of the fruit-tip softening (`rutab') and fully mature (`tamar') stages for physico-chemical analyses. Physico and chemical characters showed significant (P = 0.05) differences between cvs. Physical characters showed a decrease in all parameters studied from `rutab' to `tamar' stages except in dry wt. which increased. Chemical analyses indicated small amounts of ether extractants, crude fibre, crude protein and ash, with sugars predominant. Total sugars and reducing sugars were higher at the `tamar' stage than at the beginning of the `rutab' stage; sucrose followed the opposite trend. In general, the majority of the date cvs examined were found to be of the soft date type, characterized by the dominance of reducing sugars. AS

Grapes

1184 Moore (KJ), Johnson (MG) and Morris (JR). Indigenous yeast microflora on Arkansas white riesling (Vitis vinifera) grapes and in model must systems. Journal of Food Science 53(6); 1988; 1725-1728

The indigenous yeast microflora on Arkansas grown white riesling (Vitis vinifera) grapes and in model musts were examined during fermentation of sulphite treated (0, 25, 50 or 100 mg/L total sulphur dioxide) musts held at two temp.(-13 C and 21 C). The yeast microflora were examined with time -13 C musts were sampled at 5, 10, and 20 days; 21 C musts were sampled at 2, 4 and 8 days. A two log cycle increase in yeast counts occurred during fermentation, while little difference in counts due to sulphite treatments. Of 70 isolates, the main genera were Cryptococcus, Hanseniaspora, Pichia, Saccharomycopsis, Trichosporon, Zygosaccharomyces, Rhodotorula, Candida, Metschnikowia, and Saccharomyces. All isolates recovered showed lipolytic activity of Spirit Blue Agar. AS

Raisins

1185 Kana (K), Kanellaki (M), Kouinis (J) and Koutinas (AA). Alcohol production from raisin extracts. Volatile by products. Journal of Food Science 53(6); 1988; 1723-1724, 1749

The formation of methanol, acetaldehyde, 2-methyl-butanol-1 and 3-methyl-butanol-1 in Zymomonas mobilis alcoholic fermentation of raisin extracts, in comparison with Saccharomyces cerevisiae, was studied. Z. mobilis fermentations gave lower acidities and about 30% less of the volatile compounds than S. cerevisiae. Thus, acidity and volatiles should not be a problem in industrial fermentations with Z. mobilis. The effect of pH, initial cell concn. (ICC) and initial sugar content (ISC) were also investigated. Z. mobilis produced the lowest concn. of volatiles at pH 3.5, ISC 150 g/L and ICC 40 g/L. An increase of ISC leads to a reduction of volatiles per g EtOH. Bacteria form 2-methyl-butanol-1 and 3-methyl-butanol-1 in the raisin extract fermentation medium, as do S. cerevisiae. AS

Guava

1186 Singh (J). Effect of calcium nitrate and plant growth regulators on the storage of Allahabad Safeda guava. Indian Journal of Horticulture 45(1-2); 1988; 45-50

Effect of calcium nitrate (1 and 2% concn). NAA (50 and 100 p.p.m.), GA (20 and 40 p.p.m) and their mixtures on the storage life of Allahabad Safeda var. of guava was studied. Calcium nitrate at 1% level, NAA at 100 p.p.m. and GA at 40 p.p.m. effectively minimized the loss in wt., reduced the rate of respiration, rot percentage, and maintained the edible quality and marketability of fruits for more than 6 days by delaying the onset of senescence during storage. Calcium nitrate was more effective than NAA or GA. Of the different mixtures, 1% calcium nitrate with 100 p.p.m. NAA showed max. beneficial effect in prolonging the storage life of fruits. Untreated fruits were acceptable only for 3 days. The changes in soluble solids, acidity and ascorbic acid content of fruits during 3, 6 and 9 days of storage in fruits treated with different chemicals are also tabulated. KAR

Mangoes

1187 Charanjit Kaur Sahni and Khurdiya (DS). Physico-chemical changes during ripening in Dashehari, Chausa, Neelum and Amrapali mango. Indian Food Packer 43(1); 1989; 36-41

Mango fruits of the 4 var. were stored at ambient temp. (35.9-36.9 C) and at cool chamber temp. (23.8-27.6 C) over a max. period of 18 days and the changes in pressure, moisture, soluble solids content, ascorbic acid, carotenoid and reducing sugar contents during ripening were noted. pH, total soluble soilds(TSS), carotenoids and sugars increased in the ripe fruits, while pressure test, sp. gr., acidity and ascorbic acid declined. T3S, carotenoids, and sugars reached max. values in the fruit ripened from 6th to 9th day and thereafter they declined. KAR.

1188 Kalra (SK), Tandon (DK) and Lohani (HC). Ripening of wax coated Dashehari mango during storage. Indian Food Packer 42(5); 1988; 7-11

Dashari mango fruits were given postharvest treatment with TBZ and two commercial wax emulsion formulations Frutox and Vapor Gard and then studied their ripening behavouir under ambient conditions for 12 days. The fruits ripened on 6th day in all the treatments with TBZ treated fruits having best appearance and Frutox treated fruits least attractive. On 8th day onwards Vapor Gard fruits were best with lesser spoilage and better organoleptic score. The Vapor Gard dipped fruits ripened fastest as indicated by its firmness of 4.0 lb/in on the 3rd day of storage but the senescence was inhibited as is evident by its high organoleptic score until the end. Frutox induced subdued ripening and fruits remained green throughout the period of observation. Moisture, reducing sugars and Beta-carotene differed significantlyamong the treatments, while total soluble sugars acidity and soluble solids showed insignificant differences. Overall, Vapor Gard treatment was very effective in enhancing shelf life and improving the organoleptic score of mango fruits. AS

1189 Medlicott (AP), Reynolds (SB), New (SW) and Thompson (AK). Harvest maturity effects of mango fruit ripening. Tropical Agriculture 65(2); 1988; 153-157

The maturity at harvest of `Tommy Atkins' mango (Mangifera indica L.) was found to have an important effect on the development of fruit quality when ripened at 25 C. Fruits harvested at the mature and half-mature stages developed good quality characteristics, but immature fruits showed only limited changes during ripening. Treatment with either 1.0 ml litre^{-1} ethylene or acetylene initiated ripening at all three maturity stages, although ripening remained incomplete in immature fruits. Mature fruits ripened faster than both half-mature and immature fruits when not treated with exogenous ethylene or acetylene. The ripening rate of fruit in successive harvests over a four-wk period increased during the season. Acetylene treatment appeared more effective with early season harvests, notably for peel colour development; overall effect was less apparent in late season fruit. If harvesting of immature fruit is avoided, both ethylene and acetylene treatments at 1.0 ml $litre^{-1}$ for 24 h at 25 C improve the uniformity in quality by inducing simultaneous ripening and have potential in the commercial ripening of mango. AS

1190 Tripathi (JS). Post-harvest changes during storage and ripening of Gaurjeet mango fruits. Madras Agricultural Journal 75(3-4); 1988; 155-256

The effect of storage and ripening of mango fruits on post harvest changes was determined by storing mangoes at room temp. The data indicate that the fully mature fruits can be stored for six days without any deterioration in taste, flavour and quality as observed by a panel of judges. However, considerable changes were observed in the chemical composition of mature fruits during storage; soluble solids content, total and reducing sugars increased upto 6th day, thereafter they declined. Acidity decreased, ascorbic acid content increased upto 5 days, thereafter decreased. KAR

Water melon

1191 Teotia (MS), Sukhvir Kour) and Berry (SK). Recent advances in chemistry and technology of water melon. Indian Food Packer 42(5); 1988; 17-40

This review deals in detail the various changes during maturation; factors affecting yield and quality; quality evaluation of fruit; effect of storage on quality of fruit; transport/shipment of fresh fruits including pallet containers for shipment, water proof marine ventillation system for dry freight van containers and bulk transport and containerised storage. Composition aspect of fruit covers amino acids, sugars, pectin, pigments, enzymes and essential oil/volatile compounds. The processes products listed include juice, concentrated juice, fermentation of juice, vinegar generator, frozen pulp, and jam utilization of waste is also covered. 104 references. KAR

Persimmon

1192 Philip (T) and Chen (T-S). Quantitative analyses of major carotenoid fatty acid esters in fruits by liquid chromatography. Persimmon and papaya. Journal of Food Science 53(6); 1988; 1720-1722, 1745

A procedure for the quantitative analysis of major carotenoids and carotenoid esters in persimmons and papayas using column and liquid chromatography is described. The carotenoids and carotenoid esters were first separated by column chromatography on alumina into three fractions by elution with petroleum ether-benzene (80:20), benzene and methanol. The column fractions were further separated by reversed phase liquid chromatography and characterized. The total carotenoid contents in persimmon and papaya calculated as beta-carotene equivalents were 43 and 25 µ g/g. resp. The major carotenoids in persimmon were beta-cryptoxanthin, zeaxanthin, beta-carotene, lycopene and antheraxanthin and the major carotenoids in papaya were beta-cryptoxanthin, cryptoxanthin 5,6-epoxide, beta-carotene and antherxanthin. The xanthophylls were acylated with C_8 to C_{16} saturated fatty acids. AS

CONFECTIONERY, STARCH AND SUGAR

Confectionery

1193 Boutin (RF). Dextrose panning. Manufacturing Confectioner 68(10); 1988; 70-74

The articles describes briefly the techniques of dextrose panning and its advantages over sucrose panning. The advantages include: cost savings, production speeds and ease of manufacture. Of the three panning techniques mentioned dextrose excels in hot panned operations where its high solids and fast crystallization results in accelerated production efficiencies and shorter panning times. The use of dextrose for soft and cold panned products can also prove beneficial but to a lesser result than in hot panning. SYR

Chocolates

1194 Bertran (TH). Chocolate and compound panning Manufacturing Confectioner 68(10); 1988; 65-69

The article discusses the general requirements to control the standard process of chocolate and compound panning. The major categories considered are centres, coating, conditions and procedures, discussing the problems and remedies under each cateogry. SYR

1195 Isganitis (DK). Polishing. A review of processes and techniques. Manufacturing Confectioner 68(10); 1988; 75-78

The processes and techniques of polishing chocolate and confectionery products are briefly reviewed. A reproducible and uniform product will result if specific polishing guidelines regarding ingredients, procedures and equipment are followed. Oils and unbuffed waxes, moisture permeating through the coating starches and sugars within the glaze, and a surface which is not as smooth as possible are all problems which may cause a gloss coat to appear cloudy or dull. SYR

1196 Kitt (JS). Panning problems. Causes and remedies. Manufacturing Confectioner 68(10); 1988; 57-62

Some of the more frequently encountered problems in soft, hard and chocolate panning, their causes and remedies are briefly discussed. The problems encountered during panning includes: rough surfaces, non-uniform coating, uneven, mottled or faded colour, oily appearance, slow drying, formation of bubbles, coating distortion or pealing of centres etc. The remedies for these problems were briefly described. SYR

Starch

1197 Drouzas (AE) and Saravacos (GD). Effective thermal conductivity of granular starch materials. Journal of Food Science 53(6); 1988; 1795-1799

The effective thermal conductivity (K_{eff}) of two granular starches was investigated at various bulk densities, temp. and moistures, using the method of heated probe. Granular powders of high-amylose and high-amylopectin starches were used at bulk densities 500-800 kg/m, temp. 25-70 C, and moistures of 0-40%. The K_{eff} increased linearly with bulk density, from 0.065 to 0.220 W/mK. Temp. had a positive effect up to 6.5% moisture. At higher moistures K_{eff} increased sharply above 50 C, indicating starch-water interaction. The K_{eff} increased linearly with moisture at low (0-15%) and high (> 25%) moisture, remaining nearly constant at intermediate moistures. These changes were related to the porosity of the starches. AS

Sugar

1198 Bharadwaj (M). Modernisation of the sugar factory. Indian Sugar 38(6); 1988; 445-447

Need to modernise the sugar factories with the objective of conservation of energy, improvement in product quality, increase in product yield and greater safety to man, plant and machinery and environment are covered. KAR

1199 Hitkari (S) and Singh (M). A new approach for treatment of distillery and sugar factory effluent. Indian Sugar 38(11); 1989; 883-885

Various available methods of effluent treatment have been reviewed and modifications are proposed in the lagooning based technology. Fermentation of waste stream from sugar mills and partially treated effluents of distilleries with Azotobacter which is capable of fixing atm. N, removes BOD effectively at relatively low oxygenation level. This process is rapid, economical and produces a promising biofertiliser as a byproduct. KAR

1200 Jadhav (RD), Pimpalkar (CG) and Joshi (GV). Improvement in sugar colour trial of hydrogen peroxide as bleaching agent. Indian Sugar 38(6); 1988; 441-443

Treatment with 500 cc of hydrogen peroxide (50% w/w) diluted in 10 l of water and charged to 50 T of A massecuite pan half an hour before discharging the pan has shown (i) 15% reduction in colour, (ii) 70% reduction in sulphur dioxide content and (iii) 36% reduction in sulphited ash. KAR

1201 Ram Kumar and Jain (VK). Efficiency of formula for semikestner evaporator. Part II. Indian Sugar 38(8); 1988; 647-649

After considering the factors responsible for the efficiency of the semikestner evaporator the efficiency formula is given as n = 0.04

x Delta T x 100 where, n = efficiency of the semikestner evaporator and Delta T = temp. difference across the calandria. KAR

1202 Ram Kumar and Jain (VK). Designing a semikestner evaporator the new concept. Part III. Indian Sugar 38(9); 1988; 727-729

In the semikestner evaporator due to the long tube length the heat transfer coeff. diminishes at a higher rate in the downward direction. Due to this the mean heat transfer coeff. is also on the lower side. In the long vertical tubes the mean rate of heat transfer coeff. could be increased 2-3 times by installing the condensate tapping caps at 10 cm interval on the tubes of 3 m high. KAR

1203 Tekel (J), Farkas (P), Kovacicova (J) and Szokolay (A). Analysis of herbicide residues in sugar beet and sugar. Nahrung 32(4); 1988; 357-363

A simple quantitative TLC method for the detn. of the residues of herbicide inhibiting photosynthesis was compared with capillary GLC for the analysis of atrazine, chloridazone, lenacil, phenmedipham and desmedipham in sugar beet and sugar. No significant differences in the detn. limit and precision of the two methods were found. Monitoring of herbicide residue levels in commercial sugar revealed low levels of atrazine (0.003 mg kg^{-1} on average) in all the samples. This contamination level does not present a health hazard for consumers. AS

BAKERY PRODUCTS

1204 Akobundu (ENT), Ubbaonu (CN) and Ndupuh (CE). Studies on the baking potential of non-wheat composite flours. Journal of Food Science and Technology, India 25(4); 1988; 211-214

The baking properties of non-wheat flour composites of corn-cassava starch-soybean and corn-cassava starch-cowpea in breadmaking were examined. Results revealed that these non-wheat composite flours do not lend themselves to satisfactory dough development. Their performances were, however, improved when prepared in the form of batter. Consequently, these non-wheat blends required up to 98% water to produce acceptable product. Bread vol. increased in corn-cassava-cowpea blend over its corn-cassava-soybean counterpart resulting in lighter loaf. Increasing the cowpea level above 5% lowered the quality of bread. The corn-cassava-cowpea blend was more acceptable than the corn-cassava-soybean sample. The implications of low gluten and protein substitution are discussed. AS

1205 Oomah (BD) and Mathieu (JJ). Functionality of commercially produced wheat flour solubles in cakes, cookies, and wieners. Journal of Food Science 53(6); 1988; 1787-1791

The performance of wheat flour solubles (WFS) obtained by ultrafiltration and spray drying of a gluten-wheat starch plant effluent was evaluated in cakes, cookies, and wieners. Batter density, cake vol., and quality of high ratio white layer cake decreased with increase in the level of WFS when it was used either as a wheat flour substitute (0-20%) or an egg white substitute (0-50%). Vol. and textural characteristics of a yellow layer cake with and without substitution by WFS of 50% whole egg was not significantly different. Increasing WFS substitution levels (0-25%) of a sugar-snap cookies formulation reduced the spread factor and increased the crispness of the cookies without significantly affecting other textural characteristics. Firmness and cook stability of wieners with (6% level) and without WFS were not significantly different. AS

1206 Szczesniak (AS). Applying rheology to dough and baked products. Cereal Foods World 33(10); 1988; 841-843

This review deals with definition of rheology, relationship of rheological measurements to dough functionality and finished product quality. The article also deals with rheological measurements as quality assurance tools. PHR

Bread

1207 Usha Bajwa and Bains (GS). Supplementation of glycerolysed oils and alpha-amylases in breadmaking. I. Effect on rheological properties of dough. Journal of Food Science and Technology, India 25(4); 1988; 215-219

Effect of groundnut oil, glycerolysed groundnut oil, cottonseed oil and glycerolysed cottonseed oil with and without alpha-amylase supplements on rheological properties of dough was evaluated using Brabender farinograph and amylograph. The treatments had profound effect in decreasing dough consistency after 15 min mixing. However, peak viscosity and viscosity of paste at 95 C were appreciably increased with oils/glycerolysed oils. Mixing tolerance index and gelatinization temp. were significantly decreased. Alpha-amylases lowered falling number values and increased maltose. With intimate mixing of oils/glycerolysed oils, falling number values were found to be increased whereas maltose value decreased. Effect of increasing levels of incorporation of oils/glycerolysed oils is also presented. AS

1208 Usha Bajwa and Bains (GS). Supplementation of glycerolysed oils and alpha-amylases in bread making. II. Effect of baking quality and firmness of bread. Journal of Food Science and Technology, India 25(4); 1988; 220-222

The effect of incorporation of glycerolysed groundnut oil/cottonseed oil and/or optimal alpha-amylases of baking quality was investigated. Dough handling properties were found to be improved when glycerolysed oils were supplemented along with alpha-amylases. Loaf vol. was increased in control from 1430 to 1570 ml when 0.5% glycerolysed groundnut oil was used along with 8.0 SKB cereal amylase. Texture of the loaves was substantially improved by the glycerolysed oils. Incorporation of 0.5% glycerolysed groundnut oil distinguishably imparted a softer texture to the loaves but they turned crumbly after storage for 72 h. Bread made with 0.25% glycerolysed oils showed no such tendency to crumbliness. Storage had a profound effect on firmness of bread. AS

1209 Ylimaki (G), Hawrysh (ZJ), Hardin (RT) and Thomson (ABR). Application of response surface methodology to the development or rice flavour yeast breads. Objective measurements. Journal of Food Science 53(6); 1988; 1800-1805

A gluten-free wheat bread replacement was developed from rice flour (80%) and potato starch (20%). Using objective measurements as responses, response surface methodology was utilized to find carboxymethylcellulose (CMC)-hydroxypropylmethylcellulose (HPMC)-water combinations which could successfully replace gluten in the rice flour yeast breads from each of three rice flours. CMC and water had the greatest effect on the responses measured; HPMC had the least. Rice bread formulations were found that resulted in bread which met wheat (white) bread reference standards for specific vol., crumb and crust colour, Instron firmness and % moisture. AS

Cakes

1210 Fujii (T) and Danno (G). Properties of sponge cakes made with wheat starch. Journal of Japanese Society of Food Science and Technology '(Nippon Shokuhin Kogyo Gakkaishi') 35(10); 1988; 684-690

Sponge cakes were prepared with equal part of flour or wheat starch, sugar and whole eggs, and compared. Cakes baked from wheat starch had much larger volume and better cakes grain than those baked from wheat flour. When wheat flour was folded into the foam whipped with sugar and whole eggs, the foam volume in the cake batter decreased to 52% of the initial volume. Use of wheat starch only decreased it to 78% of the initial volume. Cake batter of wheat flour had 20% less volume and high viscosity than that of wheat starch. The reduced levels of flour or starch markedly improved the cake volume, and slightly affected the grain of cakes. The correlation was observed between the batter volume and the max, volume of the cakes in the oven. Cakes baked from the reduced levels of flour tend to collapse during baking and cooling. AS

Cookies

1211 Halek (GW) and Levinson (JJ). Partitioning behaviour and off-flavour thresholds in cookies from plastic packaging film printing ink compounds. Journal of Food Science 53(6); 1988; 1806-1808, 1822

Absolute off-flavour thresholds were determined for six solvents in a high fat cookie by a combination of sensory evaluation and gas chromatographic analysis for solvents. Thresholds at 25 C were toluene (1.2 p.p.m.), butanone-2 (5 p.p.m.), ethyl acetate (7 p.p.m.), hexane (24 p.p.m.), propanol-2 (37 p.p.m), 2-methoxy ethanol (63 p.p.m). Partition coeff. were also determined for these solvents in the cookies and in polypropylene packaging film to estimate the concn. in the film that could produce off-flavour in the cookies. AS

Tortillas

1212 Serna-Saldivar (SO), Rooney (LW) and Waniska (RD). Wheat flour tortilla production. Cereal Foods World 33(10); 1988; 855-864

This article deals with different methods of tortilla production by hot-press, die-cut and hand-stretch procedures. The quality characteristics of tortillas obtained by different methods are also discussed. The article also deals with role of different ingredients used and their quality requirements. PHR

MILK AND DAIRY PRODUCTS

1213 Batish (VK) and Sunita Grover. Improvement of dairy cultures by genetic manipulations. Indian Dairyman 40(9); 1988; 489-496

After briefly explaining the role of dairy cultures, the authors describe the molecular biology of dairy starters; role of plasmids in genetics of dairy cultures; genetics of phage resistance in dairy starters; gene cloning in lactic streptococci and lastly the cloning of vectors. KAR

1214 Duthie (AH), Fox (JR), Cavalier (JP) and Wulff (S). Modification of the Vermont test for monitoring fat adulteration of dairy products. Journal of Dairy Science 71(7); 1988; 1764-1768

GLC profile of fatty acids from 1st and 2nd extractions from Majonnier method were some use of 1st extraction, alone, for the detn. of fatty acid comp. of milk fat from dairy products saved time and solvents. The test was successfully used for detn. of added vegetable fat in milk fat. JSS

Milk

1215 Arora (KL), Harish Chander and Ram (J). Analytical techniques for indirect microbiological evaluation of milk and milk products. Indian Dairyman 40(10); 1988; 577-587

Merits and demerits of a few techniques used for assessing the microbiological quality of milk products based on the evaluation of the metabolites. These include methods for metabolic, lipolytic, proteolytic, and milk clotting activities; detection and estimation of pathogens and presence of antibiotics. KAR

1216 Balasubramanyam (BV). Advantages of low lactose milk. Indian Dairyman 40(4); 1988; 189-191

A short review dealing with prevalence and assessment of lactose intolerance in India, advantages of low lactose milk and the methods of hydrolysis of lactose in milk. 12 references. KAR

1217 Batish (VK), Sunita Grover and Singh (RS). Thermal stability of staphylococcal enterotoxins in milk and related foods. Indian Dairyman 40(9); 1988; 497-504

After describing the characteristics of the enterotoxins produced by staphylococci the authors describe the effect of heat, pH, composition of the heating medium and ionic strength on the enterotoxin. Enterotoxin once inactivated get reactivated and the conditions under which this process happens is also described. KAR

1218 Baxi (JJ). Marketing of milk and milk products. Indian Dairyman 40(5); 1988; 271-276

Co-operative marketing of milk and dairy products in India including milk collection, storage, distribution and assistance to farmers have been covered. KAR

1219 Chavarri (FJ), De Pez (M) and Nunez (M). Optimization of fermentation parameters for the production of concentrated starters from nonbitter Streptococcus lactis INIA 12. Journal of Food Science 53(6); 1988; 1854-1857

Streptococcus lactis INIA 12, a selected nonbitter strain, reached its max. counts and its highest lactic acid production in a culture medium containing 125 g/L skim milk powder, fortified with 5 g/L yeast extract and digested with 10 p.p.m. papain for 20 min at 65 C. Lactose added to the medium did not enhance growth rate or biomass production. A growth temp. of 32 C and the maintenance of pH at 6.80, with 10N NaOH as the neutralizer, were the optimum fermentation parameters in batch cultures. In ten 40-L fermentations carried out at 32 C and pH 6.80, with a 5% inoculum, a 0.2 kg/cm^2 N head space pressure and a stirring rate of 80 rpm, max counts of S. lactis (10^{10} CFU/mL) were reached after incubation for 6 h at 32 C at pH 6.80. AS

1220 Palaniswami (KS), Masillamony (PR) and Dorairajan (N). Limulus amoebolysate test in assessment of bacterial quality of milk. Indian Journal of Microbiology 28(3-4); 1988; 238-239

The application of Limulus amoebolyste (LAL) test for assessing bacterial (gram negative) quality of milk has been described and evaluated. The results show that this test is applicable at the dairy and to the refrigerated raw milk held for a few days during which the psychrotropic and psychrophilic gram negative bacteria dominate. KAR

1221 Paul (SC) and Mathur (BM). Lactose intolerance. Relationship of lactose intolerance with milk intolerance and cataract. Indian Dairyman 40(9); 1988; 511-513

Explanation for the lactose intolerance and milk intolerance are delineated and the intolerance to cow milk proteins and the racial difference in lactose intolerance and milk intolerance have been covered. KAR

1222 Prasad (MR). Milk waste in baking taste. Indian Dairyman 40(10); 1988; 589-590

The raw sour milk is separated into skim milk and cream; the skim milk is precipitated with calcium chloride, and the co-precipitate is oven dried and used at the rate of 10% in cake and biscuits mix. The cakes and biscuits prepared with the co-precipitate were tastier and crispy, possessed 5% more protein and same shelf life as that of control. KAR

1223 Slade (PJ) and Collins-Thompson (DL). Comparison of two-stage and direct selective enrichment techniques for isolating Listeria species from raw milk. Journal of Food Science 53(6); 1988; 1694-1695, 1702

Isolation of Listeria spp. from 34 milk samples was compared by direct selective enrichment (FDA method) and two-stage enrichment techniques. Nineteen were Listeria-positive, 17 yielding one sp. only, either L. innocua or L. monocytogenes, and 2 both sp. Direct enrichement and two-stage enrichement were equally effective at isolating Listeria spp. The number of isolations of L. monocytogenes was similar by both methods, but direct enrichment for more than 24 h and use of the KOH step did not enhance the number of isolations. AS

1224 Stefanelli (C), Valletrisco (M) and Azzi (A). HPLC in the control of biotechnologically transformed foodstuff. High digestibility milk. Industrie Alimentari 27(259); 1988; 364-365 (It).

Intolerance to lectose, widespread in the world and on the other side, the great importance of the milk, both under the nutritive and economic point of view, have led some industries in the countries most interested in the problem, to manufacture, by immobilized enzymes, "dclactased" products. In order to estiamte their digestibility, an investigation by HPLC, aiming to control the degree of hydrolysis of the disaccharide, has been carried out. AS

Milk products

1225 Alam (AA). Process equipment manufacture. Indian Dairyman 40(5); 1988; 285-290

The status of dairy equipment manufacture in India has been briefly reviewed and the Research and Developmental efforts made to mechanise the production of Indian dairy products including khoa, ghee, channa/paneer and shrikhand have been outlined. 12 references. KAR

1226 Dora (PG) and Suresh Prasad. Cost estimation for processing and packaging of dried milk products. Indian Dairyman 40(4); 1988; 193-197

Four milk spray drying plants manufacturing skim-milk, whole milk, baby food and ice-cream mix powder were selected. The steam and electrical energy consumed by the condensing and drying units were estimated and the cost of raw materials, packaging materials and the utilities are found out and the production cost of dried milk products are determined. The analysis reveals that steam and electrical energy consumption is max. for the production and packaging of ice-cream mix and baby food powder; the cost of processing is max. for skim milk powder. The analysis also indicates that raw material cost shares 50.39 to 73.58% of the total cost but the processing and packaging of various dried milk products ranges from 15.92 to 36.31 and 3.67 to 32.80% of the total cost resp. AS

1227 Mathur (BN). Processing technology for dried milk products. Indian Dairyman 40(5); 1988; 277-278

After testing the range of dried milk products produced the author lists the major items of capital investment needed for producing spray dried infant formula and also the cost of production. KAR

1228 Umoh (VJ), Adesiyun (AA) and Gomwalk (NE). Enterotoxin production by staphylococcal isolates from Nigerian fermented milk products. Journal of Food Protection 51(7); 1988; 534-537

Five hundred sixty eight staphylococcal isolates derived from 369 market samples of fermented milk products were examined for enterotoxigenicity; 6.5% of the isolates were found to be enterotoxigenic. Data pertaining to staphylococcal count, pH and titratable acidity of the samples that contained enterotoxigenic types are presented. 73% of enterotoxigenic isolates produced SEA, 10.8% SEB and 2.7% produced SEA and SEB and SEA and SEC each. No correlation was found between either staphylocoagulose thermonuclease, haemolysin and enterotoxin production. CTD

Cheese

1229 Al-Mashikhi (SA), Li-Chan (E) and Nakai (S). Separation of immunoglobulins and lactoferrin from cheese whey by chelating chromatography. Journal of Dairy Science 71(7); 1988; 1747-1755

Different adsorption and chelating chromatographic methods were used to isolate immunoglobulins and lactoferrin from cheese whey. Among three adsorption solid supports (silica controlled pore glass, and alumina), controlled pore glass showed the highest adsorption of immunoglobulins, however, its capacity was low. 1.4-Butanediol diglycidyl ether-iminodiacetic acid on Sepharose 6B was loaded with copper ion and used for the same purpose. Of the two peaks eluted using pH gradient, the first yellowish peak was rich in lactoferrin and the second was rich in Ig. The purity of IgG in the Ig rich fraction as indicated by radial immunodiffusion was 77.2 and 53.0% for acid whey and Cheddar cheese whey, resp. The capacity of the column was high a 25-ml copper charged column could absorb Ig from 1 L of cheese whey. Modification of histidine residues in Ig with diethyl pyrocarbonate almost completely eradicated the adsorption, implicating the coordination compound formation between histidine in Ig and Cu on the chelating column, as the adsorption mechanism. Enzyme linked immunosorbent assay of the Ig thus separated demonstrated their binding activity against lipopolysaccharides extracted from Escherichia coli, Salmonella typhimurium, and Bordetella parapertussis. AS

1230 Alkhalaf (W), Piard (J-C), Soda (ME), Gripson (J-C), Desmazcaud (M) and Vassal (L). Liposomes as proteinase carriers for the accelerated ripening of Saint-Paulin type cheese. Journal of Food Science 53(6); 1988; 1674-1679

The possibility of accelerated cheese ripening through addition of liposome entrapped proteinase to milk was investigated. Both enzyme encapsulation rate in liposomes and their retention in cheese were evaluated with multilamellar vesicles (MLV) and reverse-phase evaporation vesicles (REV). Using REV in Saint-Paulin type curd, no N loss was observed to the whey due to the added enzymes in liposomes. In cheese, REV produced a more progressive proteolysis during ripening than MLV did, REV addition did not lead to texture defects. Bitterness development, a critical defect in enzyme added cheese, could be delayed and minimized using REV. AS

1231 Brenda Watson. The watchword is variety among today's British cheeses. Indian Dairyman 40(10); 1988; 567-570

Recent development in production of various types of cheeses in Great Britain have been mentioned briefly. KAR

1232 Ikins (WG), Kwak (HS), Zink (GS) and Jeon (IJ). Comparison of methods for quantitation of free fatty acids in cheese. Journal of Food Science 53(6); 1988; 1915-1916

A comparison of three relatively rapid methods of determining free fatty acids concn. in cheese was performed by correlating the results with a more laborious but accurate gas chromatographic (GC) technique. Acid degree values were found to correlate poorly with the GC data, particularly for short chain fatty acids. Values obtained using a copper soap method correlated closely with the GC data for total and long chain fatty acids, but did not correlate as well with short chain fatty acids levels. The extraction-titration method was found to be a simple and reliable technique that yielded values which correlate closely with short chain fatty acid concn. AS

1233 Kanawjia (SK) and Singh (S). Significance of enzymes addition in flavour acceleration of cheese. Indian Dairyman 40(4); 1988; 183-187

Recent advances in cheese flavour development using lipase, protease and its mixtures have been reviewed and it is proposed that mixtures containing various enzymes are more advantageous than single types of enzymes. 38 references. KAR

1234 Sachdeva (S), Tewari (BD) and Singh (S). Recent developments in processed cheese technology - a review. Indian Dairyman 40(8); 1988; 415-423

Aspects covered in this review include preparation of processed cheese spread and use of diversified ingredients for preparing processed cheese foods. Some novel processes; special formulations including diatetic cheese; ultrafiltration in processed cheese manufacture; use of emulsifiers; processing equipments; chemical, microbiological and sensory qualities as also browning in cheese. 59 references. KAR

1235 Tewari (BD) and Singh (S). Innovation in technology of cottage cheese. Indian Dairyman 50(4); 1988; 199-208

Certain essential requirements for the manufacture of good quality cheese with current innovation are described under the following heads: milk; milk treatments; membrane processing; starter culture; rennet; curd formation; vat-failure; cutting the curd; cooking the curd; washing; creaming; and shelf life. 53 references KAR

Cottage cheese

1236 Craddock (MA) and Morr (CV). Evaluation of alternative methods to increase calcium retention in cottage cheese curd. Journal of Food Science 53(6); 1988; 1680-1683

The effect of several methods including addition of rennet, addition of carrageenan and use of 2:1 (v/v) preconcentrated skim milk by ultrafiltration (UF) upon calcium retention, yield, composition and sensory properties of dry curd cottage cheese was investigated. Although each of the processing methods resulted in the manufacture of dry curd cottage cheese with different compositions and properties, none of them was satisfactory for increasing calcium retention. Added carrageenan bound additional whey proteins, added rennet interfered with curd syneresis and whey expulsion during cooking and use of UF preconcentrated skim milk resulted in an increase in yield, total solids and protein of the curd. AS

Chhana

1237 Tarafdar (HN), Das (H) and Sitaram Prasad). Mechanical kneading of chhana and quality of rasogolla. Journal of Food Science and Technology, India 25(4); 1988; 223-227

Chhana is an acid coagulated product of milk. Kneading, the important step in rosogolla making, was attempted with a disc grinder at 22, 47, 72 and 89 cm/sec. disc speeds. Tests on chhana had shown that the values of mixing index, flow behaviour index (n), consistency coeff. (k) and time, (Tc) required for deforming a chhana sample under a constant pressure became nearly constant when the disc speed was 89 cm/sec. The values of n, k and T_c for the chhana obtained at this speed were resp. 0.345, 368 Pa. s^n and 24.8 sec. and the corresponding values of a hand kneaded chhana used for rasogolla making were 0.335, 356 Pa. s^n and 15.3 sec. Rasogolla was prepared by cooking 10 g ball of kneaded chhana in boiling water and later sweetening it in a sugar syrup. The rasogolla made from the chhana obtained at 89 cm/sec. disc speed showed the min deviation in creep behaviour in comparison to the market rasogolla. The overall sensory score of the former rasogolla differed by 7.5% from the `market rasogolla'. AS

Rasogolla

1238 Singh (U) and Ganesh). Preparation of filled rasogolla utilizing sweet cream butter milk solids. Indian Dairyman 40(4); 1988; 445-447

Good quality filled rasogolla (an Indian sweet milk food) can be economically prepared using sweet cream butter milk, skim milk powder and hydrogenated vegetable oil. The product is comparable in appearance, body, texture, flavour and overall quality to conventionally prepared rasogolla. The buttermilk solids which may not be economically utilised by small creameries can find good use in the manufacture of indigenous filled rasogolla. KAR

Whey

1239 Mangino (ME), Huffman (LM) and Regester (GO). Changes in the hydrophobicity and functionality of whey during the processing of whey protein concentrates. Journal of Food Science 53(6); 1988; 1684-1686, 1693

Cheddar cheese whey was ultrafiltered to yield whey protein conc. (80% WPC). The retentates were heated at 64 or 72 C for 15 sec or received no heat treatment. Changes in composition and hydrophobicity during processing were related to WPC functionality. Heating at 72 C decreased retentate hydrophobicity and had a detrimental affect of WPC functionality, while heating at 64 C did not. Day to day variation in the milk supply and processing conditions did not affect hydrophobicity but the unit operations did have an effect. Ultrafiltration increased the alkane binding values of the retentate compared to the whey. Spray drying the retentate increased surface hydrophobicity and decreased alkane binding values of the WPC. AS

1240 Mathur (BN), Kumar (A) and Ladkani (BG). UHT-processed beverages pave way for economic utilization of whey. Indian Dairyman 40(10); 1988; 533-535

A short note dealing with national and international trend in whey beverage production and also a scheme for the manufacture of UHT processed fruit whey beverages. KAR

Yoghurts

1241 Tomar (SK). Nutritional value of yoghurt. Indian Dairyman 40(8); 1988; 429-432

Aspects covered include preparation of yoghurt and content of carbohydrate; protein; lipids; vitamins and minerals and effect of yoghurt on growth and metabolism. KAR

Milk proteins

1242 Prasad (J), Prasad (S) and Murari (K). Interaction of milk proteins during UHT processing and some chemical changes. Indian Dairyman 40(4); 1988; 209-212

This general article deals with the interaction between alpha-lactalbumin and beta-lactoglobulin and between kappa-cassein and beta-lactoglobulin as also between alpha-lactalbumin and kappa-cassein in model system. In the milk system the aspects covered include effect of ultra high temp. processing on different protein fractions, and effect of UHT processing on loss of amino acids and changes in S-containing compounds. KAR

MEAT AND POULTRY

Meat

1243 Bohac (CE), Rhee (KS), Cross (HR) and Ono (K). Assessment of methodologies for colorimetric cholesterol assay of meats. Journal of Food Science 53(6); 1988; 1642-1644, 1693

The objective of this study was to assess the critical factors influencing the values for meat cholesterol determined colorimetrically. Procedure variations tested included; no saponification of total lipid extract before colour development with 15 min saponification at 80 C, with or without antioxidant protection and with 60 min saponification at 80 C, with or without antioxidant protection. Without the saponification step, meat cholesterol values were overestimated. Samples with a large percentage of unsaturated fatty acids yielded higher cholesterol values when lipid extracts were saponified without antioxidant protection than with. Meat cholesterol values obtained by the procedure involving 15 min saponification with antioxidant protection were similar to those obtained by a commonly used gas chromatographic procedure. AS

1244 DeFreitas (Z) and Molins (RA). Development of meat snack dips. Chemical, physical, microbiological and sensory characteristics. Journal of Food Science 53(6); 1988; 1645-11649

Snack dips containing 50% ham, 26% bacon or 28% pepperoni in combination with sour cream, unflavoured yoghurt and tofu were developed. The developmental phases of the study were discussed in relation to ingredient and meat flavour selection, formulation and sensory evaluation. Microbiological, chemical and physical analyses of the new products indicated that the meat-containing snack dips were stable and safe under storage conditions simulating wholesale (3 wks 2-4 C), retail (10 days, 5 C), household (10 days, 8-10 C) and longer than normal temp. abuse (12 and 24 h, 24-25 C). AS

1245 Favetto (GJ), Chirife (J), Scorza (OC) and Hermida (C). Colour-changing indicator to monitor the time-temperature history during cooking of meats. Journal of Food Protection 51(7); 1988; 542-546

Development of a time-temp. integrator based on colour changes produced by the chemical reaction between reducing sugars (i.e. fructose, glucose, lactose) and l-lysine (Maillard's reaction), is described. The indicator is particularly suitable to provide an objective method for confirming that a given temp. in the inner part of a meat product cooked in water in hermetically sealed packages, was achieved. This is needed to ascertain inactivation of the foot and mouth disease (FMD) virus and is required for meat imported from countries in which the FMD virus is present. The indicator is placed at the surface of the meat package and will avoid the need of opening the package for inspection. AS

Beef

1246 Abu-bakar (A), Reagan (JO), Vaughters (HM), Campion (DR) and Miller (MF). Effects of chilling method on the sensory, chemical and cooking characteristics of ground beef patties. Journal of Food Science 53(6); 1988; 1618-1620, 1641

1247 Bansal (A) and Mandokhot (UV). Studies on differentiation of cattle meat from the meat of other species of animals. II. Comparative efficacy of different serological methods. Journal of Food Science and Technology, India 25(4); 1988; 232-235

Efficacy of different serological tests like DID, CIE, IE and micropassive haemagglutination (HA) was studied in detecting cattle meat from the meat of other sp. of animals like buffalo, sheep, goat, pig, chicken and donkey by using RACM and BACM sera. The HA test was observed to cause nonspecific haemagglutination, while IE though observed to be specific was least sensitive. Both DID and CIE were equally specific and sensitive. However, DID test was most suitable from the point of view of simplicity and reliability. Examination of different factors like concn. of agarose, buffers NSS used to suspend agarose and pH of buffers used showed that 0.6% agarose in NSS or in PBS pH 7.5 gave best results. Where facilities are available, CIE test using 0.6% agarose in Williams and Chase buffer with constant current of 5 mA/75 x 25 mm slide for 30 min would be the choice. AS

1248 Lanari (MC) and Zaritzky (NE). Potassium sorbate effect on pigment concentration of refrigerated beef. Journal of Food Science 53(6); 1988; 1621-1627

1249 Martino (MN) and Zaritzky (NE). Ice crystal size modifications during frozen beef storage. Journal of Food Science 53(6); 1988; 1631-1637

1250 Recio (HA), Fradella (LC), Cross (HR), Smith (GC) and Savell (JW). Palatability of beef skirt steaks as influenced by grade maturity group, anatomical location and mechanical tenderization. Journal of Food Science 53(6); 1988; 1628-1630

Cattles

1251 Garcia-Vidal (W), Blackwell (JH), Correa (CA), Huertas (S) and Urrestarazu (V). Virucidal effectiveness of flexible pouch processing of meat products prepared from foot-and-mouth disease affected cattle. Journal of Food Science 53(6); 1988; 1650-1652

Mutton

Goat

1252 Sharma (N), Sharma (BD), Keshri (RC) and Padda (GS). Effect of particle size on processing of goat meat patties. Journal of Food Science and Technology, India 25(4); 1988; 249-250

Comminution as a means of particle size reduction in processing of goat meat patties has been studied. A comparison of comminution methods indicated that the patties processed from coarse minced meat (passing through 9 mm plate of the meat grinder) had reduced desirable appearance, juiciness, texture and overall acceptability scores. Desirability of patties increased as the particle size decreased. Sensory panel scores for overall palatability were highest for the one coarse + one fine mince (4 mm plate) followed by 2 min chopping in bowl chopper. AS

Sheep

Lambs

1253 Koohmaraie (M), Babiker (AS), Schroeder (AL), Merkel (RA) and Dutson (TR). Acceleration of postmorteam tenderization in ovine carcasses through activation of Ca dependent proteases. Journal of Food Science 53(6); 1988; 1638-1641

Infusion of lamb carcasses with 0.3 M CaCl resulted in acceleration of postmortem tenderization process. Control and treated animals had similar cathepsin B, H and L activities. Various control groups had similar CDP-I, -II and inhibitor activities, whereas these were all decreased in CaCl infused animals. Hence, it was concluded that the activation of Ca -dependent proteases was responsible for the observed postmortem proteolysis and tenderization and, it seems unlikely that activity of these cathepsins is related to postmortem tenderization under conditions used in this experiment. AS

1254 Mahendrakar (NS), Khabade (VS) and Dani (NP). Studies on the effect of fattening on carcass characteristics and quality of meat from Bannur lambs. Journal of Food Science and Technology, India 25(4); 1988; 228-231

Carcass traits, non-carcass components and some quality characteristics of meat from Bannur ram lambs reared upto 10-11 months of age on range feeding and fattening were compared. Fattened lambs attained 22.7 kg live wt. compared to significantly lower live wt. of 14.5 kg for range fed sheep. The studies indicate high growth potential for Bannur breed when fed under confinement as seen by the much higher dressing yield, meat yield and meat/bone ratio. Also the yield of less valuable parts such as skin, head, blood, etc. as a proportion of live wt. is much lower for fattened sheep. Increased intramuscular fat content due to fattening of lambs did not affect the WHC, cooking loss and thermal shortening of muscles. The markedly lower shear force values for muscles from fattened lambs indicate that fattening produces tenderer muscles than those from range fed ones. AS

Pork

1255 Morgan (JB), Calkins (CR) and Mandigo (RW). Effect of trim level, cooking method, and chop type on lipid retention, caloric content, and cholesterol level in cooked pork. Journal of Food Science 53(6); 1988; 1602-1604, 1630

1256 Neel (SW), Reagan (JO), Mabry (JW) and Miller (MF). Effect of rapid chilling and accelerated processing on the physical and sensory characteristics of cured pork bellies. Journal of Food Science 53(6); 1988; 1905-1906

1257 Paxhia (JM) and Parrish (FCJr). Effect of postmortem on titin and nebulin in pork and poultry light and dark muscles. Journal of Food Science 53(6); 1988; 1599-1601, 1670

Purified myofibrils were prepared from samples of chicken breast and thigh muscles and from light and dark portions of pork semitendinosus muscle at death and after storage at 4 C and 22 C for 1, 3, and 7 days postmortem. Sodium dodecyl sulphate-polyacrylamide gel electrophoresis (SDS-PAGE) was used to examine the effect of postmortem storage of muscle on titin and nebulin. Results indicated that titin and nebulin were more rapidly degraded in light than in dark chicken muscle. In contrast, titin and nebulin were more rapidly degraded in dark than in light pork muscle. AS

1258 Whang (K) and Peng (IC). Photosensitized lipid peroxidation in ground pork and turkey. Journal of Food Science 53; 1988; 1596-1598, 1614

The initiative role of singlet oxygen in hydroperoxide production in ground pork and turkey was studied. Ground meats treated with or without various antioxidants and illumination (350 ft-c, 4 C) were monitored for lipid peroxidation by peroxide value (POV). Ground turkey breast meat developed higher ($P < 0.01$) POV during illumination than did thigh meat. In both pork and turkey, light exposure resulted in higher ($P < 0.01$) POV than samples kept in the dark. The prooxidant effect of light was reduced ($P < 0.01$) by a singlet oxygen quencher (2, 2, 6, 6-tetramethyl-4-piperidone) in turkey meat, and by another singlet oxygen quencher (N, N, N', N'-tetramethylethylene diamine, TMEDA), a free radical sçavenger (butylated hydroxyanisole, BHA) and TMEDA + BHA in pork. AS

Pigs

1259 Takahashi (K), Shirai (K) and Wada (K). Melting behaviour of gels prepared from isolated subunits of collagen. Journal of Food Science 53(6); 1988; 1920-1921

Products

Frankfurters

1260 Lin (KC), Keeton (JT), Gilchrist (CL) and Cross (HR). Comparisons of carboxymethyl cellulose with differing molecular features in low-fat frankfurters. Journal of Food Science 53(6); 1988; 1592-1595

1261 Zayas (JF) and Lin (CS). Quality characteristics of frankfurters containing corn germ protein. Journal of Food Science 53(6); 1988; 1587-2591, 1595

Poultry

Chickens

1262 Dawson (PL), Sheldon (BW) and Ball (HRJr). Extraction of lipid and pigment components from mechanically deboned chicken meat. Journal of Food Science 53(6); 1988; 1615-1617

Three washing solutions were tested to reduce colour and remove fat from mechanically deboned chicken meat (MDCM). MDCM was mixed with either 0.5% sodium bicarbonate, 0.1% acetate buffer, or tap water and passed through a 3.9 mm mesh screen. The meat retained by the screen (captured meat, CM) and the solution passing through the screen (not-captured, NC) were centrifuged separately. All extraction treatments resulted in significant reductions in fat with the NC meat being significantly lower in fat than the captured meat regardless of the wash media. Bicarbonate washed CM was significantly lighter in colour ($L^* = 64.1$) than all other extraction treatments and lighter and less red ($a^* = 4.5$) than the MDCM ($L^* = 49.2$, $a^* = 9.0$). AS

Hens

1263 Kondaiah (N), Panda (B), Anjaneyulu (ASR) and Singh (RP). Utilisation of whole meat components from spent hens for chicken sausage production. Indian Journal of Poultry Science 23(2); 1988; 135-141

The quality and acceptability of chicken sausages prepared from (i) deboned meat (DM), (ii) whole meat (DM + skin, gizzard, heart and cooked meat), and (iii) total meat (DM + skin, gizzard, and heart) were evaluated. Stable emulsion was produced from (i) followed by (ii) and (iii). Cooking loss was < 6% in all the three formulations. Flavour score was less for (ii). Sausages from all the three formulations were acceptable with higher score for (i). Raw sausages of the 3 formulations could be stored upto 10 days at 5 C and upto 90 days at -10 C without appreciable increase in microbial counts, thiobarbituric acid value and sensory scores. Chicken sausage from doboned meat was bettwer acceptable followed by total meat and whole meat sausages. KAR

Turkeys

1264 Cremer (ML) and Hartley (SK). Sensory quality of turkey rolls roasted at two temperatures and reheated with varying sauces in three types of institutional ovens. Journal of Food Science 53(6); 1988; 1605-1609

Turkey rolls were roasted at 105 C and 165 C and reheated with broth, starch-thickened sauce and without sauce in institutional microwave, infrared, and convection ovens to determine the effects on sensory quality characteristics. Turkey reheated without sauce was scored significantly ($P < 0.05$) poorer for roasted aroma, juicy mouthfeel, cooked turkey, flavour, stale off-note and overall quality than turkey reheated with sauce, but scores were similar between the two sauces. Cooked turkey flavour was significantly better after heating in convection than infrared or microwave ovens. Stale flavour was less and overall quality was better after heating in the convection than in the infrared oven. AS

1265 King (AJ) and Patel (SB). Effect of sodium salts and added water on colour of dark meat turkey patties subjected to long-term storage. Journal of Food Science 53(6); 1988; 1907-1908

Patties from a control (all meat), treatment 1 (meat, 1.1% water, 1.0% NaCl and 0.5% STP) and treatment II (meat, 11.1% water, 1.0% NaCl and 0.5% STP) were frozen for 0 to 24 wk, broiled, and analyzed for colour attributes. Treated patties had lighter exterior surfaces with reduced redness and increased yellowness. The opposite effects were observed for the interior of patties. Treatment II had elevated values for internal yellowness as compared to treatment I storage caused an increase in both external and internal colour values. Sensory scores indicated that internal redness of treated patties was greater than that of the control but gradually decreased during storage. AS

1266 Patel (SB), King (AJ) and Lee (YB). Effect of sodium salts and added water on physical, chemical and sensory properties of dark turkey meat subjected to longterm frozen storage. Journal of Food Science 53(6); 1988; 1610-1614

Patties from a control (100% meat), treatment I (meat, 1.1% water, 1.0% NaCl and 0.5% STP) and treatment II (meat, 11.1% water, 1.0% NaCl and 0.5% STP) were frozen for 0 to 52 wk, broiled, and analyzed. Yield, moisture, expressible moisture, tenderness, and juiciness of both treatments were improved compared to the control. TBA values of treatment II were greater than that of the control. The force needed to penetrate top surface of patties (FI) from control and treatment I was similar and greater than that of patties from treatment II. The force needed to penetrate bottom surfaces of patties (F2) differed across formulation. Storage adversely affected moisture content of control along with F2 and TBA values of all formulations. Juiciness was negatively correlated with moisture. AS

Products

1267 Radhakrishna (K), Vijaya Rao (D), Jayathilakan (K), Joyce D'Souza Sharma (TR). Studies on the freeze drying of a rehydratable poultry product as large pieces. Indian Food Packer 42(5); 1988; 41-52

Preparation and processing by freeze dehydration of an Indian speciality food made from large pieces (6-10 cm long and 20-30 mm thick) of chicken and spices (chicken masala) has been studied to get a stable and flavour some convenience product which would rehydrate rapidly at < 70 C and conform to microbiological specifications required to qualify it as a `Space food'. The traditional methods of open cooking and grilling in a charcoal pit or tandoor rendered the freeze dried product tough and difficult to rehydrate but with low microbial load. Baking at 200 C for 60 min gave a product of superior rehydration and organoleptic features but of less acceptable quality. By studying the microbiology of the different preparation and processing steps the sources and extent of contamination were identified, control measures implemented and final freeze dried `Chicken in spice' produced which under accelerated storage conditions (37 C, 3 months) was found to be chemically stable. The final product contained moisture 2.0-2.4%, fat 16-18% and protein 64-65%. The products was acceptable even after 3 months when vacuum packed and stored at 25 C or 37 C. KAR

SEAFOODS

1268 Femeena Hassan. Common bacteria of public health significance found in processed frozen seafoods. Seafood Export Journal 20(10); 1988; 13-14

Incidence of bacteria of public health significance usually encountered in frozen seafoods, which comprise Escherichia coli, Staphylococcus aureus, faecal streptococci and Salmonella has been studied. KAR

Fish

1269 Antony (KP), Rao (CVN) and Govindan (TK). Bulk packages for storage and transportation of salted and dried fish. Fishery Technology 25(2); 1988; 112-116

The effect of bulk packaging on the storage (180 days) of salted and dried fish was studied at ambient conditions (temp. 25 to 34 C, RH 65 to 95%). Four packaging systems [(1) gussetted high density polyethylene (HDPE) woven sacks having circular loom and laminated with 100 gauge low density polyethylene (LDPE). (ii) pillow type multiwall paper sacks made of 100 gsm kraft paper (5 lines) with 300 gauge LDPE liner inside, (iii) gussetted jute sacks lined inside with 200 gauge LDPE, (iv) gussetted HDPE traditionally woven sack laminated inside with 100 gauge LDPE] were tried. Among (i) (iii) and (iv) were packed with 50 kg dry fish and (ii) was packed with 20 kg dry fish. Among these packs only (iv) was found to be best suited for dry fish packaging as they could withstand the hazards of handling, transportation and storage. It was water resistant and no insect attack occurred during the entire period of 180 days of storage. KAR

1270 Careche (M) and Tejada (M). Interference by formaldehyde in the 2-thiobarbituric acid test for rancidity. Journal of the Science of Food and Agriculture 43(1); 1988; 49-57

The 2-thiobarbituric acid (TBA) test is often used to detect oxidative rancidity, although certain limitations of the technique have been described. This study was of formaldehyde (FA) interference in the TBA test in model systems involving various concn of malonaldehyde (MA), FA and TBA. At a TBA concn. of 20 μ mol/ml^{-1} it was found that FA could give rise to turbidity or precipitation. However, as the amount of MA in the reaction mixture increased (10 to 400 times higher than the upper limit of the standard curve), higher FA concn were required. Turbidity or precipitation resulted in fluctuating readings, and centrifugation or filtration lowered the readings (532 nm) to below those obtained when no FA was present. The ratio of TBA to MA must be greater than or equal to 1000 for full colour development, and hence lack of colour may be due to the TBA acting as a limiting factor in the reaction. The presence of a peak at 323 nm and /or turbidity or precipitate confirmed of the reaction between FA and TBA. FA competed with MA for TBA thereby lowering the effective TBA:MA ratio. Other TBA-reacting substances (TBARS) present in the medium may augment this effect. AS

1271 George Joseph (K), Muralidharna (V), Unnikrishnan Nair (TS) and Kalaimani (N). Quality of cured fish from the Maharashtra coast. Fishery Technology 25(2); 1988; 120-123

Chemical, bacteriological and organoleptic characteristics showed wide variations in sun-dried/dry salted fish collected from five centres of coastal Maharastra. In dry salted products, moisture ranged from 16.17 to 46.58%; salt from 5.18 to 22.75% acid insoluble ash from 1.0 to 6.83%. Brown discolouration and case hardening were prominent in dry salted fish. In sun-dried fish moisture content ranged from 16.15 to 39.51% and acid insoluble ash from 0.42 to 2.82%. The sun-dried fish, though no salt was added in the process, showed fairly good amount of salt. 4.19% of the cured fish had high bacterial (total plate count) load of 10 to 10 , 95-81% and 10 to 10 ; 62.01% of the samples showed the presence of `red'. KAR

1272 Hardardottir (I) and Kinsella (JE). Extraction of lipid and cholesterol from fish muscle with supercritical fluids. Journal of Food Science 53(6); 1988; 1656-1658, 1661

Supercritical fluid extraction (SFE) was explored as a method for removing lipids and cholesterol from fish muscle. Selected conditions of extraction pressure, time, temp. and sample size were evaluated for effective removal of lipid and cholesterol. Increasing carbon dioxide pressure from 2000 to 5000 psig and the temp. from 40 to 50 C had little effect on the extent of lipid removal. Increasing the extraction time from 3 h to 9 h increased lipid removal. Ethanol as an entrainer significantly enhanced lipid extraction at all pressures used. Supercritical carbon dioxide and supercritical carbon dioxide plus ethanol removed 78% and 97% of the lipids and 97% and 99% of the cholesterol, resp. from trout muscle. The solubility of the muscle proteins decreased following extraction. AS

1273 Sathiadhas (R) and Panikkar (KKP). A study on marketing structure and price behaviour of marine fish in Tamil Nadu. Seafood Export Journal 20(12); 1988; 5-7, 9, 11-15, 17, 1

This survey conducted in Tamil Nadu State of India covers the marketing structure including primary, wholesale and retail markets. Marketing channels, marketing expenses, trend in price behaviour, marketing margin, share of fishermen and middlemen in consumer's rupees, the relationship between landing centre, wholesale and retail prices are other aspects covered. The fishermen's share in the consumer's rupee ranges from 32 to 72 paise and that of wholesalers 4 to 27 paise. Retailers get the margin of 18 to 45 paise. KAR

1274 Vasanth Shenoy (A), Thankamma (R), Lekshmy Niar (A) and Gopakumar (K). Texturised meat from low cost fish. Fishery Technology 25(2); 1988; 124-126

The suitability of five sp. of fish, threadfin bream (Nemipterous japonicus), cat fish (Tachysurus jella), ribbon fish (Trichiurus sp.), barracuda (Sphyraena jello) and jew fish (Pseudosciaena sp.) for production of texturised meat was studied. All the above sp. were found to be good sources for preparing texturised meat. The protein content of the texturised meat product from all the sp. was higher than that prescribed for fish protein conc. type A. The product had excellent rehydration capacity and firm and elastic texture. There was no significant difference in the rehydration capacity of texturised meat from all the sp. studied. The texture was influenced by salt concn. a salt content of 1.5 to 2% resulted in the desirable firm and elastic texture. Salt content did not significantly influence the rehydration capacity. KAR

1275 Wong (K), Bartlett (F) and Gill (TA). A diagnostic test strip for the semiquantitative determination of trimethylamine in fish. Journal of Food Science 53(6); 1988; 1653-1655

A diagnostic test strip assay for trimethylamine (TMA) was developed for the rapid evaluation of microbiological quality of seafood. The method is based on trimethylamine dehydrogenase and is specific for TMA. Compounds such as trimethylamine oxide, dimehtylamine, monomethylamine, and ammonia did not interfere with the measurement of TMA. The entire procedure required less than 5 min at room temp. Visual comparison of unknown samples to a set of trimethylamine standards enabled the semiquantitative analysis in the range of 0.2 to 5 u g trimethylamine N. The method enabled the rapid evaluation of seafood quality and correlated well with the traditional spectrophotometric procedure for the detn. of TMA. AS

Crayfish

1276 Vejaphan (W), Hsieh (TC-Y) and Williams (SS). Volatile flavour components from boiled crayfish (Procambarus clarkii) tail meat. Journal of Food Science 53(6); 1988; 1666-1670

The volatile flavour components of boiled red swamp crayfish (Procambarus clarkii) tail meat were characterized by a combination of dynamic headspace concn. on a porous polymer trap, high resolution gas chromatography, mass spectrometry and chromatography coupled aroma sniffing evaluation. A total of 70 volatile compounds in many different chemical classes were identified and reported for the first time in crayfish tail meat. Various components gave green grassy, woody, buttery, metallic, or sulphur-like aroma characteristics. Most of the sensory characteristics of the individual components in the aromagram agreed well with the identification of the chemical structures eluted within the corresponding chromatographic period. However, several pleasant nutty, meaty and salty-meaty areas in the gas chromatographic aromagram remained unidentified. AS

Plaice

1277 Iwamoto (W), Yamanaka (H), Abe (H), Ushio (H), Watabe (S) and Hashimoto (K). ATP and creatine phosphate breakdown in spiked plaice muscle during storage, and activities of some enzymes involved. Journal of Food Science 53(6); 1988; 1662-1665

The onset of rigor-mortis of plaice Paralichthys olivaceus spiked at the brain started much faster at 0 C than at 10 C. Correspondingly, ATP and creatine phosphate breakdown and lactic acid accumulation in the muscle were faster at 0 C. ATP concn. was constant at 5 µ g/mol/g until creatine phosphate decreased from the initial concn. at around 20 µ mol/g to 5 µ mol/g, irrespective of storage temp. Simultaneously, lactic acid accumulated, slowly at first, until ATP concn. started decreasing, and then quickly accompanying the full-rigor state. Activities of the enzymes involved in ATP and creatine phosphate consumption-myofibrillar and sarcoplasmic ATPases and creatine kinase-were temp.-dependent, and decreased with decrease in temp. AS

Salmon

1278 Hata (M), Sato (Y), Yamaguchi (T), Ito (M) and Kuno (Y). The chemical and amino acid compositions in tissues of cultured and wild coho salmon (Oncorhychus kisutch). Bulletin of the Japanese Society of Scientific Fisheries ('Nihon Suisan Gakkai-shi') 54(8); 1988; 1365-1370 (Ja).

The chemical and amino acid compositions in several tissues of cultured and wild coho salmon Oncorhychus kisutch were measured and compared. A remarkable difference in lipid content in the ordinary muscle and integument was found between the cultured and wild fish. The former fish contained lipids about 4 times higher than the latter fish. The chemical composition of the dark muscle of these fish, however, resembled each other. The major amino acids of the flesh were Asp, Glu, Leu and Lys. There was no marked difference in the amino acid composition between the cultured and wild fish. Extractive-N and free amino acid contents were higher in the liver and viscera than those in the other tissues. The major free amino acids in these tissues were Ala and Glu. The other free amino acids, abundantly found were His, Gln and Arg in the ordinary muscle, liver and testis resp. The dark muscle, liver, viscera and gonad contained high levels of taurine, while the ordinary muscle had large amounts of anserine. AS

1279 Suzuki (H), Chung (BS), Isobe (SHayakawa (S) and Wada (S). Changes in omega-3 polyunsaturated fatty acids in the chum salmon muscle during spawning migration and extrusion cooking. Journal of Food Science 53(6); 1988; 1659-1661

The effects of spawning migration and extrusion cooking on Omega-3 polyunsaturated fatty acids (PUFAs) in chum salmon muscle were studied. Total lipid content in the muscle of the fish during spawning migration was lower than that during feeding migration. However, the content increased to double those in the raw materials by pretreatment of extrusion cooking. Lipids of muscle and outer layer during spawning migration contained higher percentages of docosahexaenoic acid (22:6) than those during feeding migration. Moreover, PUFAs were not lost by extrusion cooking and its pretreatment. These results suggest that production of foods containing a rich amount of Omega-3-PUFAs is possible by extrusion cooking of the muscle of chum salmon during spawning migration. AS

Sardines

1280 Tanaka (M), Kuei (C-W), Nagashima (Y) and Taguchi (T). Application of antioxidative Maillard reaction products from histidine and glucose to sardine products. Bulletin of the Japanese Society of Scientific Fisheries ('Nihon Suisan Gakkai-shi') 54(8); 1988; 1409-1414

Maillard reaction products (MRP) were prepared by refluxing the mixture of L-histidine and D-glucose (1:3 molar ratio) in 0.1M phosphate buffer (pH 5, 7 and 9) for upto 24 h. It was found that antioxidative effect of MRP increased as a function of reaction time, particularly at the later stage of the reaction (after 6-10 h). At initial pH of 7 and 9, antioxidative effect of MRP became significant. It was also revealed that antioxidative effect exponentially increased as a function of the development of reducing power. MRP also retarded autoxidation of sardine oil, but their antioxidative effect in the case of sardine oil was less than that in the case of linoleic acid. Since POV of sardine oils which had been already oxidised (POV about 500 or 100) was decreased to an extent by the addition of MRP, it was suggested that MRP worked as peroxide destroyers besides autoxidation-breakers. Application of MRP (pH 9, 24 h heating) to Kamaboko-type sardine products (boiled or deep fried) was also experimented. MRP were mixed in sardine minced meats at the levels of 0-5% and the products were stored at 4 C. It was found that MRP effectively inhibited autoxidation of sardine products during storage. SGB

Trouts

1281 Han (TJ) and Liston (J). Correlation between lipid peroxidation and phospholipid hydrolysis in frozen fish muscle. Journal of Food Science 53(6); 1988; 1917-1919

The effect of EDTA and KCN on the course of phospholipid hydrolysis and peroxidation in minced trout muscle was tested during storage at -10 C. EDTA had no significant effect on either process but KCN caused a significant reduction in phospholipid hydrolysis as measured by lysophosphotidylcholine. The addition of ferric ion increased both lipid peroxidation and lipid hydrolysis, providing support for the hypothesis that these processes were linked in fish muscle. AS

Oysters

1282 Cook (DW), Chai (T), Hackney (CR), Martin (RE), Otwell (WS) and Ward (DR). Liquid loss in shucked oyster (Crassostrea virginica) meats during ice storage. Journal of Food Science 53(6); 1988; 1671-1673, 1683

East and Gulf coast oysters were processed under Code of Federal Regulation (CFR) requirements, packed in retail size containers and stored on ice for 18 days. A 3-day intervals, containers of oyster meats were tested for free liquid content. Gulf coast oyster meats lost more liquid and in a different pattern during storage than East coast oysters. Seasonal differences in liquid loss were noted in Gulf coast oysters only. Washing oyster meats by blowing in accordance with CFR requirements did not increase liquid loss during the first 9 to 12 days of storage. Liquid loss in Gulf coast oysters was inversely correlated with salt content. Except for oysters with low salt content, and containers of oyster meats did not exceed 15% free liquid during storage. AS

Prawns

1283 Joseph (AC), Balachandran (KK) and Prabhu (PV). Improvement in quality and shelf-life of whole dried prawn. Fishery Technology 25(2); 1988; 117-119

Treatment of whole prawn Metapenaeus dobsoni in 10% brine containing 0.1% citric acid for 20 min followed by sun-drying yielded a product having good physical, chemical and organoleptic characteristics. Retardation of fungal incidence, reduction in total volatile N (TVBN) and improved in flavour are some other advantages. The treated product had a shelf life of about 30 wk compared to 20 wk for untreated controls and 7 wk for commercial sample. KAR

1284 Mathen (C) and Thomas (F). Solid loss and weight gain in prawns during storage in ice. Fishery Technology 25(2); 1988; 110-111

An effort was made to explain the mechanism of solid loss and wt. gain in meat of whole prawn and prawn meat stored in ice. This phenomenon occurs in two stages. In the first stage water is absorbed without loss of solids resulting in max. increase in wt. In the second stage both solids and water are lost resulting in gradual decrease in wt. from the max. reached but not reaching the original wt. It was concluded that whole prawns stored in ice up to two days give the max. peeled wt. without loss of nutrients and at the same time the peeling becomes easier. KAR

1285 Nambiar (VN), Valsan (AP), Gard (DK) and Damle (SP). Value added consumer products from non-penaeid prawns (Acetes indicus) of Maharashtra coast. Indian Food Packer 42(5); 1988; 12-16

Flakes and soup powder were prepared as value added products from non-penaeid prawns. The ingredients used for flake making include fresh Jawala, Tapioca starch, salt, pepper, and cardamom and the flakes had a final moisture content of 5-6% and protein content of 10%. Flakes deep fried in oil had appealing appearance and flavour. The ingredients used in the preparation of soup powder are given as also the proximate composition. Soup powder contained 18.46% protein and 5.4% fat. Both the products when packed in polythene bags and kept at ambient condition stored well for 4 months without loss of crispness. The cost of production is Rs. 20 per kg for flakes and Rs. 15 per kg for soup powder. KAR

Shrimps

1286 Govinda (TK). Packaging of freeze dried shrimp. Seafood Export Journal 20(10); 1988; 33, 35

1287 Jiang (S-T) and Lee (TC). Effect of modified ice storage on the quality and prevention of darkening discolouration of shrimp Solenccera prominentis. Bulletin of the Japanese Society of Scientific Fisheries ('Nihon Suisan Gakkai-shi') 54(8); 1988; 1415-1422

In order to develop a convenient and effective method for preservation of shrimp aboard and during processing, a few ice-salt mixtures were experimented. Based on the quality parameters such as microbial growth, volatile base N (VB-N) extractable N (AA-N), inosine monophosphate (IMP) ratio and sensory quality, the investigation showed that the spoilage of shrimp meat was retarded by storing the shrimp in an ice-salt mixture (crushed ice plus 3% NaCl, w/w) or ice-salt mixture containing 0.1% potassium sorbate, or ice-salt mixture containing 0.1% potassium sorbate and 0.1% sodium erythorbate. The darkening discolouration was prevented and the freshness, IMP and sensory quality were maintained by the use of ice salt mixture containing 0.1% potassium sorbate and 0.1% sodium erythorbate, during 15 days of storage. SGB

PROTEIN FOODS

Baby foods

1288 Mrudula Kalpalathika (PV), Nanjunda Swamy (AM) and Patwardhan (MV). Studies on canned strained baby foods based on vegetables. Journal of Food Science and Technology, India 25(4); 1988; 236-240

Canned strained baby food based on green peas was developed. Thermal process time of 61 min was found necessary to achieve F value of 4 at 115.5 C. Cut-out analysis of the canned product indicated that the product was safe microbiologically. The product was found to be a good source of protein (30% on dry wt. basis) and minerals and vitamins. Thermal processing caused a decrease in ascorbic acid (37%), thiamine (82%), and of essential amino acids like lysine (10%), isoleucine (19%), methionine (13%) and threonine (19%). However, the canned strained green peas based baby food showed growth promoting efficiency almost similar to that of commercial infant milk food in young weanling rats. AS

1289 Mrudula Kalpalathika (PV), Nanjundaswamy (AM), Dhanaraj (S) and Patwardhan (MV). Storage studies on canned strained baby foods based on carrot and green peas. Journal of Food Science and Technology, India 25(4); 1988; 241-246

Canned strained carrot baby food (CBF) and canned strained green pea baby food (PBF) were evaluated for certain physico-chemical and sensory parameters during storage for 180 days at normal (27 C and 65% RH) and accelerated (38 C and 92% RH) conditions. Both carrot and green pea baby foods kept well for 180 days at normal storage conditions, but they could be stored without much change upto 135 days under accelerated conditions. Changes in moisture, acidity and non-enzymatic browning were negligible. Loss of ascorbic acid was gradual at normal conditions and was sudden and rapid (82 and 60%) at accelerated storage conditions. Condition of storage and duration did not affect either total carotene or Beta-carotene. Chlorophyll in PBF decreased irrespective of storage condition and its duration (58 to 41%). Conditions of storage affected the sensory quality parameters including colour and appearance, aroma, taste and overall quality of the baby foods. However, these changes were slight at normal compared to accelerated condition. Period of storage also influenced these changes. AS

ALCOHOLIC AND NON-ALCOHOLIC BEVERAGES

1290 Molony (RH). The use of bentonite as a water treatment aid in the beverage industry. Food Technology in New Zealand 23(6); 1988; 35-36

This paper describes various methods adopted for water treatment in the beverage industry, the most common being superchlorination, floculation and precipitation, sand filtration followed by carbon filtration for dechlorination. This also discusses the advantages of the use of Bentonite as a water treatment aid in the beverage industry. NGKR

1291 Sanni (AI) and Oso (BA). The production of agadagidi. A Nigerian fermented beverage. Nahrung 32(4); 1988; 319-326

The traditional process for preparing agadagidi is described. Yeasts and bacteria were the associated microorganisms involved in various stages of fermentation. The frequently isolated genera are Saccharomyces, Leuconostoc, and Streptococcus, Bacillus and Micrococcus occurred occasionally. Morphological and biochemical properties of ten isolate were studied in pure cultures. There was variability of occurrence of the associated microorganism during isoaltions. Titratable acid and alcohol content increased gradually till the end of fermentation, while the total soluble solid and pH however decreased. AS

Alcoholic beverages

Beer

1292 Billedeau (SM), Miller (BJ) and Thompson (HCJr). N-nitrosamine analysis in beer using thermal desorption injection coupled with GC-TEA. Journal of Food Science 53(6); 1988; 1696-1698, 1706

A fast and sensitive method is described for determining a mixture of volatile N-nitrosamines in beer and other malt products. It consists of direct extraction of the sample with dichloromethane, vol. reduction, cleanup by trapping volatiles onto Tenax-TA, and thermal desorption injection into a capillary gas chromatography-thermal energy analyzer. Average recovery of N-nitrosodimethylamine added to beer ranged from 70 to 81%. N-Nitrosodimethylamine and N-nitrosopyrrolidine were detected in 10 samples of various domestic and imported beers analyzed. Total volatile N-nitrosamine concn. ranged from 0.03 to 1.10 p.p.b. in beer. Min. detection limit of the method was 0.01 p.p.b. for N nitrosodimethylamine, a 10-fold increase in sensitivity comapred to other similar methods. AS

Wines

1293 Cabrera (MJ), Moren (J), Ortega (JM) and Medina (M). Formation of ethanol, higher alcohols, esters and terpenes by five yeast strains in musts from Pedro Ximenez grapes in various degree of ripeness. American Journal of Enology and Viticulture 39(4); 1988; 283-287

The behaviour of four Saccharomyces cerevisiae strains and Torulaspora delbrueckii toward fermentation of sterile musts from Pedro Ximenez grapes in different degrees of ripeness is studied. Ethanol production by four Saccharomyces, strains was similar and higher than that of T. delbrueckii, particularly in those musts of high glucose content devoted to sherry wine making. However, the Saccharomyces strains especially cerevisiae A and cerevisiae B, produced more volatile acidity. Regarding the aromatic fraction, neither cerevisiae A nor chevalieri stood out in any respect, while the remaining yeasts investigated showed unlike behaviour and yielded significantly different amounts of various compounds and fractions. AS

1294 Fumi (MD), Trioli (G), Colombi (MG) and Colagrande (O). Immobilization of Saccharomyces cerevisiae in calcium alginate gel and its application to bottle-fermented sparkling wine production. American Journal of Enology and Viticulture 39(4); 1988; 267-272

The production of bottle-fermented sparkarticle ling wine using yeasts immobilized into calcium alginate beads is reported. In particular, the concn, of cells in the gel, the kinetics of fermentation, the transfer of Ca during fermentation, and the clarity and quality of the sparkling wines obtained were studied. The results show that: (1) the use of immobilized cells dose not cause any significant change in the refermentation processes; (2) a relationship exists between the quantity of beads used and the increase of calcium content in sparking wine; (3) cell release does not affect the clarity of the wines; and (4) the main components (ethanol, organic acids, total N, and higher alcohols) are not appreciably different in sparkling wines obtained by immobilized yeasts when compared with traditional sparkling wines, but some differences are found as regards certain amino acids and some aroma components. AS

1295 Mora (J), Barbas (JI), Ramis (B) and Mulet (A). Yeast microflora associated with some Majorcan musts and wines. American Journal of Enology and Viticulture 39(4); 1988; 344-346

Fresh and fermenting must yeast microflora were determined in four samples of Majorcan wine grape cvs. Ten different yeast sp. were identified from 300 isolates. Candida stellata was the predominant (43%-90%) yeast in musts; others were much less abundant. Saccharomyces cerevisiae was not isolated from any fresh must, yet it predominated during fermentation. BV

1296 Ough (CS) and Trioli (G). Urea removal from wine by an acid urease. American Journal of Enology and Viticulture 39(4); 1988; 303-307

Urea, the main precursor for ethyl carbamate formation, is present naturally in certain wines. Treatment of these wines with a preparation of killed cells containing an acid urease will remove the major potential source of ethyl carbamate. The action of the enzyme is fairly rapid. The cells can be reused a number of times with little loss in activity. A number of different wines were tested. Variability of the response to the enzyme action was due to pH. In the range of wines pHs it is most effective at higher pHs. In certain wines some inhibition was noted beyond the pH effect. Methods of use are suggested. AS

1297 Pardo (I), Garcia (MJ), Zuniga (M) and Uruburu (F). Evaluation of the APT 50 CHL system for identification of Leuconostoc oenos. American Journal of Enology and Viticulture 39(4); 1988; 347-350

The API 50 CHL systems was assayed to determine its accuracy in classifying some sp. of lactic acid bacteria isolated from musts and wines. The results show that this method is not appropriate for identification of Leuconostoc oenos strains isolated from wine of the Utiel-Requena area (Spain). BV

Sherry wines

1298 Cabezudo (MD) and Almy (J). Enrichment of aldehydes and ketones in sherry. Journal of Food Science 53(6); 1988; 1900-1901, 1904

An enrichment technique for aldehydes and ketones using Girard's reagent T was used on Oloroso sherry. The gas chromatogram for the enriched extract was relatively simple and showed peaks that were obscured in the chromatogram of the unenriched extract. As a result, 2-acetofuran, 5 methylfurfural, acetophenone, 2-thiophenecarboxaldehyde, alpha-methylcinnamaldehyde, and cinnamaldehyde were identified in sherry for the first time. The enrichment process was carried out at temp. lower than 35 C. AS

Non-alcoholic beverages

Coffee

1299 Fahldieck (R) and Konig (EJ). Application of micro-electronical computer techniques in storage of raw coffee. Lebensmittelindustrie 35(2); 1988; 76-77 (De).

1300 Gecan (JS), Bandler (R) and Atkinson (JC). Microanalytical quality of imported green coffee beans. Journal of Food Protection 51(7); 1988; 569-570

Samples of imported green coffee beans have been analysed as per FDA'S macroanalytical procedure for mammalian excreta, insect damage, and mold contamination. 70.6% of the samples showed insect damage, 23.5% samples, mold contaminated mammalian excreta was found in 9.3% of the samples. CTD

1301 Suwa (N), Shirota (N) and Machida (H). Effects of food emulsifiers on spoilage of canned coffee caused by thermophilic spore forming bacteria. Journal of Japanese Society of Food Science and Technology '(Nippon Shokuhin Kogyo Gakkaishi') 35(10); 1988; 706-708 (Ja).

Hydrophilic food emulsifiers were examined to prevent flat sour type spoilage of canned milk coffee inoculated with spores of thermophilic spore forming bacteria, Clostridium thermoaceticum and Bacillus stearothermophilus. Sucrose monopalmitate and sucrose monooleate showed remarkable antispoilage effect. Decaglycerin monopalmitate and decaglycerin monostearate had no effect. The effect of sucrose fatty acid ester was bacteriostatic. AS

Coffee powder

1302 Balasubramanyam (N), Indiramma (AR), Rajasekharan (T), Abraham (KO) and Shankaranarayana (ML). Studies on packaging of roasted coffee powder and raw seeds in flexible packages. Indian Coffee 53(1); 1989; 5-14

The relative performance of low and high density polyethylene and polypropylene with respect to their package worthiness and functionality for offering a shelf life of about 15 days for coffee powder and 30 days for raw seeds was investigated. Results showed that 200 gauge HDPE was suitable for offering a shelf life of 17 days at 27 C and 65% RH and 9 days at 92% RH and 38 C for coffee powder. It also withstands drop impact from 1.2 meter height. However, for a storage life of 14 days or more, at a higher temp. (38 C), 300 gauge HDPE or 200 gauge polypropylene were better suited. Polypropylene pouches were best suitable for aroma retention; however, the only drawback was its impact failure especially in 500 g unit packs. Considerable loss of volatiles was observed with LDPE pouches and this were not suited. With raw seeds as there is no problem of deterioration of moisture below 70% RH, 200 gauge LDPE offered a storage life of 30 days provided the initial moisture of coffee seeds was around 10% at the time of packaging. 200 guage polypropylene offered better protection against moisture ingress but they failed to stand the flat drop from 1.2 meter. KAR

Fruit juices

1303 Anon. The new press system for manufacturers of fruit juice. Flussiges Obst 56(2); 1989; 52-54 (De).

1304 Muller (H), Donoso (MJ) and List (D). Effects of direct sterilization-pasteurization on quality factors of fruit and vegetables juices. Flussiges Obst 56(2); 1989; 69-75 (De).

Apple juices

1305 Doner (LW) and Cavender (PJ). Chiral liquid chromatography for resolving malic acid enantiomers in adulterated apple juice. Journal of Food Science 53(6); 1988; 1898-1899

Reversed-phase HPLC with an aqueous mobile phase containing the chiral ligand-exchanger Cu^{II} / (N, N-dimethyl-L-valine)$_2$ resolved the enantiomeric Alpha-hydroxy acids D-and L-malate. Post-column detection, with acidic FC^{III} resulted in specific detection of alpha-hydroxy acids, so filtered apple juice gave a simple profile. D-Malic acid in apple juices suspected of being adulterated with synthetic DL-malic acid is presently determined from the difference between DL-malic acid (HPLC assay) and L-malic acid (L-malate dehydrogenase assay). The potential of the chiral HPLC method relative to the indirect method was evaluated and additional possibilities for direct and more sensitive detn. of D-malate were suggested. AS

Grape juices

1306 Cheynier (V), Osse (C) and Rigaud (J). Oxidation of grape juice phenolic compounds in model solutions. Journal of Food Science 53(6); 1988; 1729-1732, 1760

Oxidation of caftaric acid, catechin, epicatechin, epicatechin gallate, procyanidins B1 and B4 and 2-S-glutathionyl caftaric acid (GRP) in grape must-like model solutions containing grape polyphenoloxidase was monitored by HPLC. Caftaric acid was degraded faster than catechin, epicatechin, and epicatechin gallate. Procyanidins and GRP were oxidised very slowly when incubated alone with the enzyme. Oxidation of two-component mixtures in the presence of polyphenoloxidase was studied. Caftaric acid induced coupled oxidation of other compounds. The order of redox potentials was determined. Oxidation of catechin-caftaric acid mixtures was studied, and the oxygen consumption measured. A reaction sequence including enzymatic oxidation, coupled oxidations and the formation of caftaric acid and catechin copolymers was proposed. AS

Orange juices

1307 Medina (BG) and Garcia III (A). Concentration of orange juice by reverse osmosis. Journal of Food Process Engineering 10(3); 1988; 217-230

Orange juice was concentrated by reverse osmosis (RO) up to 50% hydraulic recovery with a polyamide membrane. Permeate fluxes and solute were determined at trans membrane pressures of 6.21 and 4.14 MPa. Pectinase treatment was required to prevent fouling and to allow cleaning in place procedures. Enzymatic treatment did not affect permeate flux or solute recoveries. Overall recovery of sugars, organic acids, and flavour-volatile components was approx. 93%. AS

Pear juices

1308 Niketic-Aleksic (G), Zlatkovic (B), Bukvic (B) and Janda (L). Effects of variety and modified technological procedure on the quality of pear juice. Flussiges Obst 56(2); 1989; 55-60, (61-63) (De).

Tea

1309 Mahanta (PK), Baruah (S), Owuor (PO) and Murai (T). Flavour volatiles of Assam CTC black teas manufactured from different plucking standards and orthodox teas manufactured from different altitudes of Darjeeling. Journal of the Science of Food and Agriculture 45(4); 1988; 317-324

The quality of black tea from Assam teas plucked to different standards and the effect of different altitudes on the volatile flavour compounds (VFC) of Darjeeling Tea was studied and results presented. The VFC of CTC black teas manufactured from fine and coarse plucking of Assam tea and orthodox teas from three different altitudes were carried out by GC-MS. It was found that fine plucking produced more monoterpenoids and less non terpenoids than coarse plucking. The VFC were similar in all teas except that geranoic acid was detected in Darjeeling teas and major differences in the VFC due to different altitudes in Darjeeling teas were not found to be significant. NGKR

1310 Malec (LS) and Vigo (MS). Seasonal variations in theaflavin, thearubigin and caffeine contents of Argentinian black teas. Journal of the Science of Food and Agriculture 45(2); 1988; 185-190

This work was carried out to investigate the variations in theaflavin (TF) and thearubigin (TR) and also total and extractable caffeine contents in Argentinian black teas of 1985/86 season in order to know about the relationship between the chemical parameters and the quality. In this connection 33 black tea samples of three grades (BOP, BOPF and PF) obtained fortnight intervals were tested for TF, TR and total and extractable caffeine contents during 1985/86 season. It was found that the total and extractable caffeine decreased gradually during the season with an early rapid increase. TF contents fluctuated following climatic variations with decrease after raining periods, whereas total colour and TF curves showed consistency in good linearship between them and TR showed erratic fluctuations throughout the season. NGKR

FATS AND OILS

1311 Bajaj (RK). Standardization in the field of oils and fats. ISI Bulletin 2(6); 1988; 233-235

Indian standards specifications laid down for soybean oil, minor oils, solvent extracted oil and vanaspathi. Other aspects dealt are quality control of imported vegetable oils, grading of oilseeds, standards for handling and storage of oilseeds and standard methods of analysis of oils and fats. KAR

1312 Tandon (S),Upreti (KK), Khanna (SK) and Singh (GB). Purity vis-a-vis proportion of non-genuineness in market samples of edible oils and fats. A second decennial survey study. Journal of the Oil Technologists" Association of India 20(2); 1988; 40-42

This paper gives the results of a second decennial survey on the quality of market samples of hydrogenated and non-hydrogenated vegetable oils, and butter/pure ghee done in Uttar Pradesh, India. The per cent non-genuine samples during two yrs. ranged from 5.1 to 66.3 in hydrogenated vegetable oil, 10.7 to 26.6 in non-hydrogenated vegetable oil, and 11.3 to 17.9 in butter/pure ghee. The overall rating of non-genuine edible oils and fats was 11.2 to 28.2%. Synthetic colour was used max. with mustard followed by linseed, groundnut and rapeseed. 17% of the tested samples had properties which varied from mandatory specifications. KAR

Fats

1313 Banerjee (R), Subrahmanyam (VVR) and Bandyopadhyay (C). Fatty acid distribution in glycerides of six fruit seed fats. Journal of the Oil Technologists" Association of India 20(2); 1988; 37-39

Fatty acid composition 1 (mole %) triacyglycerides and 2 monoglycerides of sapota (Acharas sapota), passion (Passiflora edulis), plum (Lycopersicum esculentum) and chilli (Capsicum annum) seeds are given. Glyceride composition of triacylglycerides of six fruit seed oil is also analysed and the data are presented. KAR

1314 Tsanev (R), Yanishlieva (N) and Goranov (I). Oxidation stability and fatty acid composition of selected storage and structural lipids. Influence of different high fat diet compositions. Nahrung 32(4); 1988; 365-374

The oxidation stability of storage lipids from adipose tissue and of structural lipids from liver was compared to the coeff. of oxidizability of the pure fat used: lard (L);lard + sunflower oil 2:1 (LS); butter (B) and partially hydrogenated oil (H). The oxidation stability of the corresponding high-fat dietary regiments (50 energy-%) was also investigated. The experimental groups L,LS, B and H were compared to the control group(C) fed low-fat lab. pellet-food. The coeff. of oxidizability were calculated from the fatty acid composition of the used pure fats. The oxidation stability was performed in condition of accelerated oxidation under kinetic regimen, assaying the peroxide concn. in appropriate time intervals. The coeff. of oxidizability fats and storage lipids were very similar. This is explained by the fact that the fatty-acid composition of storage lipids reflected that of the corresponding high-fat diets. The oxidation stabilities in storage lipids were markedly lower than these in the respective dietary regimens. The highest oxidation stabilities in storage lipids were markedly lower than in lipids from adipose tissue was found in group B, and the lowest in group LS. Contrarywise, the oxidation stability in liver lipid showed the following declining sequence: C > H > L > LS > B. The discrepancies in oxidation stability of the various specimens (pure fats, dietary fats, storage and structural lipids) may be explicated by an intervention of factors with pro- and anti-oxidative action. The large deviations in fatty acid composition in the examined tissues in comparison to the composition of the resp.; high-fat diets may also play an important role in this respect. These parallel studies on oxidation stability at different levels could improve our possibilities for evaluation of the stability and biological value of fats. AS

Butter

1315 Younes (NA) and Nasr (MA). Fatty acid content of imported butter oil. Crasas Y Aceites 39(4-5); 1988; 242-244

Seven samples 2 kg each labeled as a pure butteroil were purchased and marked as B, C, D, E, F, G and H. Samples A made of local cow's butter oil was taken as a control. The fatty acid contents of the samples and triglycerides were determined using TLC technique for the separation of the triglycerides, and GLC to identify the fatty acid methyl esters of the triglycerides. The fatty acids of four samples C, D, E, and F were characterized with high levels of $C_{18:0}$, $C_{18:3}$ and $C_{20:0}$ acids whereas fatty acid C_4 through $C_{16:0}$ were found in low concn. Furthermore, $C_{18:1}$ and $C_{18:2}$ acids did not reach their normal levels in the authentic milk fat, the max. level of any acid did not reach even 1% of the total fatty acids. The iodine value of the previous four samples was found to be comparatively lower than the average of the normal milk fat. It has been also reported that the ratio of saturated to unsaturated fatty acids was comparatively higher than that reported for the control sample. These observations indicates that the samples C, D, E and F were produced from a cow's milk fed on large quantities of marine oil. Two samples, B and H, had a fatty acid content nearly similar to the fatty acid content of the control sample. Consequently, the iodine value, and the saturated to unsaturated fatty acids ratios were approx. within the normal limits of the iodine value and the saturated to unsaturated acid of the control sample. The dry rations of the cows might have affected the fatty acids contents of sample G. It had a higher level of $C_{16:0}$ acid, and slightly lower content of $C_{18:1}$. It also had a lower iodine value than that reported for the control sample. The study concluded that the butter fat produced from the cow's milk fatted on large quantities of oils with a high content of polyunsaturated fatty acids, would analytically misslead the results and appeared as adulterated butterfat. AS

Butteroils

1316 Wilhelm (CL), Heydon (J), Whiteman (R), Amer (MA) and Nawar (WW). Enhancement of shortening stability by incorporation of butteroil. Journal of Food Science 53(6); 1988; 1838-1839, 1853

Butteroil, sunflower oil, olive oil and a blend containing equal portions of the three oils were used for potato frying and examined periodically for oxidative stability. Analysis included measurements of polymers, cyclic monomers, the change in dielectric constant and volatile compounds. The blend exhibited greater stability than expected on the basis of the data obtained from the individual oils. In one frying experiment, for example, the polymers and cyclic monomers formed in the blended oil after 37 h were 0.6% and 0.2%, resp. as compared to calculated values of 1.8% and 0.5%, resp. The higher stability of the blended shortening against oxidation appeared to reflect the presence in butteroil of a protective agent or agents sufficient to protect other less stable oils. AS

Fatty acids

1317 Prabhudesai (AV). A rapid method for the conversion of fatty acids to their methyl esters for gas-liquid-chromatographic analysis. Journal of the Oil Technologists" Association of India 20(2); 1988; 27-29

A simple and rapid method for the quantitative conversion of fatty acids to their methyl esters which can be directly injected into gas-chromatograph is described. When the reagent prepared by adding thionyl chloride to methanol is used, the conversion of fatty acids to their methyl esters is quantitative without any side reactions. The complete operation requires 25-30 min only. KAR

1318 Tahoun (MK), Shata (OH), Mashalley (RI) and Abou-Domia (SA). Influence of selected sugars and temperature of fatty acids composition in Candida tropicalis. Nahrung 32(4); 1988; 327-333

Temp., mono- and disaccharides affected lipids, production as well as odd-chain and unsaturated fatty acids contents of Candida tropicalis. With various sugars as carbon sources at 30 C, the order for biomass production was, galactose > glucose > sucrose > fructose > lactose. On the other hand, the odd-chain fatty acids contents decreased in the following order: fructose, sucrose, glucose and lactose. Lowering the temp. of cultivation to 15 C, decreased biomass and lipids production. However, a notable decrease in odd-chain fatty acids contents was detected. AS

Geotrichum candidum

1319 Bhotmange (MG), Shastri (PN) and Rao (BY). Studies on immobilized microbial lipases. Part I. Lipase from Geotrichum candidum. Journal of the Oil Technologists" Association of India 20(2); 1988; 34-36

The extracellular lipase was isolated from Geotrichum candidum cultivated on salt-glucose-basal medium. Enzyme was purified by dialyzing against polyethylene glycol followed by fractionation on DEAE-Cellulose. The purified enzyme (free lipase) was immobilized on two supports, Amberlite resin IR-400 and wooden shavings treated with TiCl. The rates of hydrolysis of oils by the free and bound lipases were in decreasing order of oleic, linoleic and lauric acid. There were only minor differences in esterification rates. KAR

Lipids

1320 Pokorny (J), Davidek (J), Tran Ha Chi Valentova (H), Matejicek (J), Dlaskova (Z). Reactions of oxidized lipids with protein. Part 15. Mechanism of lipoprotein formation from interactions of oxidized ethyl linoleate with egg albumin. Nahrung 32(4); 1988; 343-350

During the reaction of oxidized ethyl linoleate with egg albumin in dry medium at 60 C, hydroperoxides were rapidly decomposed almost completely, while carbonylic anisidine-active and thiobarbituric-acid-active substances were decomposed rapidly in the begining and only slowly afterwards. Both hydroperoxides and carbonylic oxidation products were substantially more stable in mixtures with cellulose than with albumin. Hydrogen-bonded lipoproteins were rapidly formed, passed through a max., and remained nearly constant in the last reaction stage. Covalently bonded lipids in lipoproteins were mainly formed in the stage following the rapid decomposition of hydroperoxides and carbonylic compounds, and immediately following the decrease of hydrogen-bonded lipoproteins. The binding of oxidized lipids into lipoproteins was accompained by the formation of protein oligomers and by the loss of available lysine. AS

Oils

1321 Sil (S), Pratima Sengupta, Gandhi (RS). Modified method for detection of Argemone oil by thin layer chromatography. Journal of the Oil Technologists" Association of India 20(2); 1988; 33-34

In this method, oil sample in the hexane was shaken with acetonitrile-water and the alkaloid in acetonitrile was reextracted with chloroform, which was separated, dried and spotted on TLC plate along with standard sanguinarine alkaloid and developed with benzene:methanol. The orange fluorescent spot at Rf 0.8 is specific for argemone oil which can be detected up to 50 p.p.m. level. KAR

Avocado oils

1322 Martinez Neito (L), Camacho Rubio (F), Rodriguez (Vives (S) and Moreno Romero (MV). Extraction and characterization of avocado oil. Crasas Y Aceites 39(4-5); 1988; 272-277 (De).

The avocado mesocarp oil of the var. Bacon, Fuerte and Hass is obtained by different processes as prssing, extraction by solvents, centrifugation and alkaline hydrolysis. In the avocado oil are studied the yield, the characteristic parameters and the fatty acids and sterols composition. The extracted and dehydrated flesh is a good energetic and proteinic corrector for animals feed. Also it was assayed the relationship between oil water from the flesh and the maturation grade of the avocado fruit. On the other hand the maturation grade is an interesting parameter to determine the best grade in the harvest and trade. AS

Coconuts oils

1323 Sajid Hussain, Sastry (GSR) and Prasada Raju (N). Detection of foreign oil adulteration in coconut oil by size exclusion chromatography. Journal of the Oil Technologists" Association of India 20(1); 1988; 17-21

A simple, rapid and semiquantitative method based on mol. wt. distribution (MWD) of triglycerides has been developed for detecting coconut oil adulteration by other vegetable oils. This method is based on size exclusion chromatographic technique (SEC) and can detect adulteration of coconut oil by a foreign oil to a min. concn. of 2.5% by observing changes in mol. wt. and their distribution pattern. SE chromatograms and MWD of various glycerides present in adulterated coconut oil with mustard oil, castor oil, palm oil and paraffin oil are presented to clarify this. The mol. wt. difference between coconut oil and the adulterated oil should be > 150. KAR

Groundnut oils

1324 Nagaraj (G) and Murthy (TGK). Fatty acid composition of wild relatives of groundnut. Journal of the Oil Technologists" Association of India 20(1); 1988; 14-15

The yield and fatty acid composition of oil from 9 wild Arachis sp. are reported. A. apressipila had the highest amount of oil (59.6%) followed by A. stenosperma (56%) and A. sp. GKP 9993 with 52%. The wild sp. contained higher linoleic acid with A. pusilla reaching a max. of 61.5% followed by A. villosulicarpa (57.2%). The IV ranged between 120-130. The oil stability index (18:1/18:2) was low in all the sp. except A. sp GK 30011. KAR

1325 Sil (S), Pratima Sengupta, Maya Mitra and Gandhi (RS). Detection of palmolein in groundnut oil by thin layer chromatography. Journal of the Oil Technologists" Association of India 20(2); 1988; 33

TLC method has been developed to detect palmolein in groundnut or coconut oil up to 5% level. In this method oil samples after dissolving in hexane, was extracted with a mixture of acetonitrile and water and reextracted with hexane twice, dried and evaporated under vacuum and analysed by TLC using solvent system benzene: ether: cychlo-hexane: chloroform. Presence of palmolein shows blue fluorescent spot at Rf 0.8. KAR

Karanja oils

1326 Chakraborty (A) and Bhattacharyya (DK). Edible quality karanja oil by mixed solvent refining procedure. Journal of the Oil Technologists" Association of India 20(2); 1988; 29-30

Edible quality karanja (P. pinnata) oil has been obtained by mixed solvent refining process preceded by degumming in the oil phase with phosphoric acid followed by silica gel bleaching and deodourisation. Mixed solvent refining gave better quality end product and the neutral oil loss was lower compared to the conventional alkali refining. Deodourisation at 180 C and at 5-6 mm pressure completely removed the odouriferous compounds. KAR

Mustard oils

1327 Murthi (TN) and Devdhara (VD). Determination of allylisothiocyanate in Indian mustard oil by high pressure liquid chromatography. Journal of the Oil Technologists" Association of India 20(1); 1988; 12-13

A rapid liquid chromatographic method has been developed for allylisothiocyanate detn. in mustard oil. This is based on the appearance of a peak from a methanolic extract with 3 min R_t for allylisothiocyanate using Zorbax-ODS C18 column and U.V. detector at 254 nm. Allylisothiocyanate even at 0.05% in mustard oil can be determined. KAR

Orange seed oils

1328 Lazos (ES) and Servos (DC). Nutritional and chemical characteristics of orange seed oil. Crasas Y Aceites 39(4-5); 1988; 232-234

Orange seeds produced during juice extraction were investigated. On a dry basis, the data obtained were: crude oil 36.2%, crude protein 16.6%, crude fiber 18.6% and ash 3.64%. Food energy value was 2.56 Kj/100 g. The seeds were found to have considerable amounts of minerals (K, Ca, Mg, Fe, Cu, Zn, Mn and P). The characteristics of seed oil were: sp. gr. at 20 C 0.9189, refractive index at 40 C 1.4624, iodine value 99.5, saponification number 195.8 and unsaponifiable matter 1.2%. The major fatty acid of the extracted seed oil was linoleic (18:2) at concn. of 39.27%, followed by palmitic (16:0), 25.44% and oleic (18:1), 24.64%. Myristic (14:0), hexadecenoic (16:1), stearic (18:0), linolenic (18:3), arachidic (20:0) and eicosenoic (20:1) were also found. The main sterol of unsaponifiable matter was Beta-sitosterol, 87.84%, followed by campesterol, 9.00%. Cholesterol, stigmasterol and Delta^{5} -avenasterol were also found. AS

Palm oils

1329 Wessels (H) and Osterkamp (G). Palm oils and palm oil fractions and their analytical differentiation. FAT Science and Technology 90(10); 1988; 375-376, 377-380 (De).

An effort has been made to differentiate total palm oils from palmolein and palmostearine. Palm oils of different origin and their fractions obtained by different methods have been examined. The fatty acid composition, the fatty acids present at Beta-position in the glyceride, slip point, iodine value, etc. have been reported. MNK

Soybean oils

1330 Lee (EC) and Min (DB). Quenching mechanism of Beta-carotene on the chlorophyll sensitized photooxidation of soybean oil. Journal of Food Science 53(6); 1988; 1

The effects of 0, 5, 10, and 20 p.p.m. Beta-carotene on the oxidation of 0.033, 0.066, 0.165, 0.330, or 0.660M soybean oil in methylene chloride containing 4 p.p.m. chlorophyll have been studied by measuring headspace oxygen depletion in gas-tight sample bottles during 24 h of light storage. The oxygen depletion was measured by a thermal conductivity gas chromatograph. The rate of singlet oxygen formation in soybean oil by 4 p.p.m. chlorophyll was 0.17 u mol. oxygen/h/mL headspace during first 24 h of storage. The quenching mechanism study of Beta-carotene on the chlorophyll sensitized photooxidation of soybean oil showed that Beta-carotene minimized the oxidation of soybean oil by quenching singlet oxygen. Beta-carotene did not quench chlorophyll. AS

1331 Mistry (BS) and Min (DB). Prooxidant effects of monoglycerides and diglycerides in soybean oil. Journal of Food Science 53(6); 1988; 1896-1897

Effects of 0, 0.25 and 0.5% monostearin, distearin, monolinolein or dilinolein on the oxidative stability of soybean oil were studied by measuring oxygen in the headspace of oil battles by gas chromatography. As the levels of the monoglycerides and diglycerides increased from 0, 0.25 to 0.5%, headspace oxygen during storage decreased. The control sample (0%) was significantly different from the samples containing monostearin, distearin, monolinolein or dilinolein at Alpha-0.05. All these mono- and di- glycerides acted as prooxidants in soybean oil. AS

1332 Ullrich (F) and Grosch (W). Flavour deterioration of soybean oil. Identification of intense odour compounds formed during flavour reversion. FAT Science and Technology 90(9); 1988; 332-336

Aroma dilution analysis of volatile conc. isolated from reverted soybean oil resulted in 11 odour compounds having high aroma values. Nine of these compounds were identified as: 3(Z)-hexenal, octanal, 1-octen-3-one, 1,5(Z)-octadien-3-one, nonanal, 2(E)-nonenal, 2(Z)-nonenal, 3(Z)-nonenal and 2(E), 6(Z)-nonadienal-3(Z)-Hexenal, the C -aldehydes and the two vinyl ketones contribute with high aroma values to the beany, grassy odour note of the reversion flavour. AS

Syzygium cuminii seed oils

1333 Daulatabad (CMJD), Mirajkar (AM), Hosamani (KM) and Mulla (GMM). Epoxy and cyclopropenoid fatty acids in Syzygium cuminii seed oil. Journal of the Science of Food and Agriculture 43(1); 1988; 91-94

Syzygium cuminii syn Eugenia jambolana seed oil was found to contain lauric (2.8%), myristic (31.7%), palmitic (4.7%), stearic (6.5%), oleic (32.2%), linoleic (16.1%), malvalic (1.2%), sterculic (1.8%) and vernolic (3.0%) acids. AS

Winged bean oils

1334 Sarojini (G), Nigam (SK) and Mistra (G). Chemical and nutritional studies with winged bean oil. Journal of the Oil Technologists" Association of India 20(2); 1988; 31-33

Winged bean seed (Psophocarpus tetragonolobus) oil possesses physico-chemical characteristics similar to peanut oil, the oil has behenic (10.5%) and lignoceric acids (3.9%). The oil was fed at 10% of the diet of weanling male rats for three months. The growth of the rats and the digestibility of the oil are normal and compared well with peanut oil fed rats. Levels of total lipid, total cholesterol, free cholesterol and triglycerides in serum and liver of rats fed winged bean oil were similar to peanut oil-fed rats. The liver lipid composition of winged bean seed oil fed rats was similar to and normal as that peanut oil fed rats. Histopathological examination of liver sections did not reveal any pathological changes and the livers were normal. KAR

SPICES AND CONDIMENTS

Condiments

1335 Hartman (TG) and Rosen (RT). Determination of ethyl carbamate in commercial protein based condiment sauces by gas chromatography-mass spectrometry. Journal of Food Safety 9(3); 1989; 173-182

Commercially obtained protein based condiments, including soy sauces, were analyzed for the presence of ethyl carbamate using gas chromatography-mass spectrometry. Samples were spiled with 100 p.p.b. of t-butyl carbamate internal standard extracted with methylene chloride and concentrated prior to GC-MS analysis. For quantification the ratio of the pseudo-mol. ions produced during isobutane chemical ionization (CI) at m/z 90 (ethyl carbamate) and m/z 118 (t-butyl carbamate) were monitored by mass chromatography. This method is simple and reliable with detection limits less than 1 p.p.b. KMA

Essential oils

1336 Kishore (N), Gupta (S) and Dubey (NK). Fungitoxic properties of essential oils of Anethum graveolens Linn. and Curcuma longa Linn. Indian Journal of Microbiology 28(3-4); 1988; 199-202

The essential oils from the fresh leaves of Anethum graveolens and rhizomes of Curcuma longa exhibited toxicity against Rhizoctonia solani Kuhn, inhibiting the mycelial growth completely. The min. concn. of the oils for absolute inhibition of the test fungus was 2000 p.p.m. Both the oils possessed broad fungitoxic spectrum and were nonphytotoxic with respect to germination, seedling growth, general health and morphology of the host plant Phaseolus aureus. The oils were found to control the damping-off disease significantly when used in seed treatment. KAR

Spices

Basil

1337 Mastrocola (D), Barbanti (D) and Armagno (R). Research on air drying of basil. I. Influence on colour. Industrie Alimentari 27(259); 1988; 341-344 (It).

For the presence of some problems connected to the seasonability of the product and to the difficulties of storing the raw material, in the last yrs. the industrial transformation of basil has become more important. In this way it has been possible to have all yr long a dried, easy-to-use product. The aim of this work was to evaluate the influence of air drying temp. and blanching conditions on colour retention of dried basil. The fresh and blanched products were dried using different time-temp. combinations. Humidity and colour were determined both on fresh and dried products. Results showed the importance of blanching on colour retention in dried products and the influence of blanching on drying time. AS

SENSORY EVALUATION

1338 O'Mahony (M), Thieme (U) and Goldstein (LR). The warm-up effect as a means of increasing the discriminability of sensory difference tests. Journal of Food Science 53(6); 1988; 1848-1850

A procedure involving rapid testing of alternate samples, known as `warm-up', was used prior to difference testing and was found to improve performance on triangle tests, both for a model and a food system. Requiring judges to describe the difference during the warm up improved performance marginally. AS

1339 Watanabe (Y), Amaike (K), Tomita (T) and Hiroshi (A). Prediction of sensory evaluation of gel texture by instrumental measurement. Journal of Japanese Society of Food Science and Technology '(Nippon Shokuhin Kogyo Gakkaishi') 35(10); 1988; 657-663 (Ja).

Prediction of sensory evaluation (SE) based on instrumental parameters was studied using a Rheometer and gels i.e., konjak, kamaboko and pudding. Correlation coeff. between SE and values derived from regression equations containing the instrumental parameters depended on the kind of gels and the parameters utilized. The most remarkable progress was observed in "Hagire" of kamaboko. Namely, correlation coeff, between "Hagire" and the value derived from the regression equation was higher (r = 0.964) as compared with that between "Hagire" and "breaking strength" (r = 0.628). The effective instrumental parameter for predicting SE of konjak was cohesiveness and that of kamaboko was breaking strength, resp. AS

FOOD STORAGE

1340 Fell (T). Tanks and silos. A changing technology. Food Manufacture 63(8); 1988; 39-41

INFESTATION CONTROL AND PESTICIDES

Fungicides

1341 Halek (GW) and Garg (A). Fungal inhibition by a fungicide coupled to an ionomeric film. Journal of Food Safety 9(3); 1989; 215-222

Growth of Aspergillus flavus and Penicillium notatum was inhibited by a fungicide coupled to a packaging film. A chemical method was employed to attach a fungicide containing amino groups to an ionomeric packaging film containing pendent carboxyl groups. Infrared spectroscopy, wt. gain and elemental analysis were used to demonstrate that the fungicide was coupled to the film. KMA

Insecticides

1342 Sharp (GJ), Brayan (JG), Dilli (S), Haddad (PR) and Desmarchelier (JM). Extraction, clean-up and chromatographic determination of organophosphate, pyrethroid and carbamate insecticides in grain and grain products. A review. Analyst 113(10); 1988; 1493-1507

This review covers extraction of pesticide residues from grains and grain products; clean-up of pesticide residue extracts from grains and grain products; gas-chromatographic detn. of organophosphate, pyrethroid and carbamate insecticides high-performance liquid chromatographic detn. of organophosphate, pyrethroid and carbamate insecticides. BV

BIOCHEMISTRY AND NUTRITION

1343 Baucells (M), Lacort (G), Roura (M), Barbera (R) and Farre (R). Determination of cobalt in foods by atomic absorption and inductively coupled plasma spectrometry. Nahrung 32(4); 1988; 409-411

Both ASS and ICP are suitable for determining cobalt in foods (milk, calf kidney, apple, bread, spinach and bovine liver). The ICP method offers the advantage of being a little more exact than AAS and also less time-consuming, but is also more expensive and less easily available in lab. than AAS. BV

1344 Hozova (B), Sorman (L), Dudasova (S) and Rajniakova (A). Study of retention of vitamin B in non-traditionally canned foods on using an experimental plan method. Nahrung 32(4); 1988; 413-414

The influence of the non-traditional canning method, based on a decreased thermosterilization intensity (15-70 min/121 C) combined with ionizing radiation (0.5-9.5 KgY), upon retention of vitamin B 6 contained in model samples of pork in its own juice, being stored for a short time (41 days) at a temp. of 20 C plus or minus 2 C is studied. BV

Biochemistry

1345 Subramoniam (A) and Satyanarayana (MN). Influence of certain dietary plant constituents on platelet aggregation. Journal of Food Safety 9(3); 1989; 201-214

The effect of seven dietary constituents 1) ciminaldehyde 2) eugenol 3) ferulic acid 4) linalool 5) piperine 6) vamillin 7) zingerone on human and rat platelet aggregation has been studied. Ciminaldehyde and eugenol both at 2 mM caused a significant stimulation of aggregation of washed platelets while zingerone exerted a similar but moderate effect at 4 mM. The other compounds were without any effect. KMA

Nutrition

1346 Galdi (M) and Valencia (ME). Stability of iron (III) chelates of nutritional interest. Journal of Food Science 53(6); 1988; 1844-1847

Stability parameters and stoichiometry of some Fe (III) chelates of nutritional interest were assessed in model systems at various pH values (2-7). Logarithms of stability constant value (log K), calculated for casein, egg yolk, soy isolate protein and phosphoserine ranged from 3.5 to 6.0. Values obtained for bovine serum albumin, and ascorbic, citric, and lactobionic acid chelates were 3.1 to 4.8, while log K values were 5.6 to 10.0 for glycine and 5.8 to 24.0 for EDTA. Biomolecular complexes were contributory at neutral pH values for glycine, citric, and lactobionic acids. AS

TOXICOLOGY

Aflatoxins

1347 Yabe (K), Ando (Y) and Hamasaki (T). Biosynthetic relationship among aflatoxin B_1, B_2, G_1 and G_2. Applied and Environmental Microbiology 54(8); 1988; 2101-2106

Aflatoxin B_1 (AFB_1), B_2 (AFB_2), G(AFG_1) and G_2 (AFG_2) are toxin secondary metabolites produced by certain strains of the common molds, Aspergillus flavus and A. parasiticus. In feeding experiments in which 27 kinds of mutants (affected in aflatoxin biosynthesis) were used, most of the mutants were able to convert sterigmatocystin to AFB_1 AFG_1. They were also able to convert dihydrosterigmatocystin to AFB_2 AFG_2. These data suggested that the same enzymes may be involved in both biosynthetic pathways. RJ

FOOD LAWS AND REGULATIONS

1348 Viscusi (WK). Predicting the effects of food cancer risk warnings on consumers. Food Drug Cosmetic Law Journal 43(2); 1988; 283-307

Efficacy of lebel declarations/warning regarding cancer risk was surveyed. Factors studied included precaution-taking, response to hazard warnings, consumer response to change in price in relation to risk by injury, warning content. It has also reviewed California stations mandated proposition 65, found it unduly alarmist. JSS

GENERAL

1349 Chung (SL), Jorgensen (KV) and Price (RL). Effects of processing temperature and added antimicrobial agents on keeping quality of Mexican-style sauce. Journal of Food Science 53(4); 1988; 1163-1164

Mexican-style hot sauce (salsa) was prepared and heated to 63 C, 71 C, and 79 C. Seven combinations of antimicrobial agents, utilizing potassium sorbate, 900 p.p.m. sodium benzoate, 700 p.p.m.; and EDTA, 50 p.p.m. were incorporated into the salsa. Samples of the salsa with a pH ranging from 3.7-3.95 and stored at 31 C (88 F) were taken initially and monthly for 96 days; microbial growth in each was determined using five culture media. Microbes decreased significantly in all samples during the storage period. Increasing the temp. of processing to 79 C and the low pH were most important in reducing microbial numbers. AS

1350 Reineccius (GA). Flavour and nutritional concerns relating to the quality of refrigerated foods. Food Technology 43(1); 1989; 84-89

Generally refrigeration can retard deterioration of cooked and also uncooked foods. However, undesirable changes do take place in refrigerated foods due to the characteristics of the food itself. Such as development of warmed-over flavour in precooked refrigerated meats, staling of bread, blackening or browning in fruits and vegetables, loss of vitamin C. These aspects have been discussed in this article. GAR

FOOD PROCESSING

Nil

FOOD PACKAGING

1351 New (JH) and Rees (DP). Laboratory studies of vacuum and inert gas packaging for the control of stored-product insects in foodstuffs. Journal of the Science of Food and Agriculture 43(3); 1988; 235-244

Cowpeas, wheat flour and wheat grain infested with various developmental stages of, resp., Callosobruchus maculatus (F) (Col: Bruchidae), Tribolium castaneum (Herbst) (Col: Tenebrionidae) and Rhyzopertha dominica (F) (Col: Bostrichidae) were packed under vacuum or in carbon dioxide or nitrogen atm. in plastic laminate pouches. After holding for up to 35 days the packs were opened and their contents incubated to allow survival to be assessed. Almost all eggs of C. maculatus were killed when vacuum packed at chamber pressures of 11 kPa or less held under vacuum for 14 days, whereas about 7% of young larvae survived these conditions. In contrast, R. dominica was more difficult to control when packed as eggs; about 10% and 2% of eggs laid survived to adulthood after two wks following packing at 11 kPa and 0.9 kPa, resp. whereas larvae and adults were effectively controlled by Ca were all killed. Populations of T. castaneum eggs, larve and adults were effectively controlled by vacuum packing at 11 kPa and holding for 7 days. None of the insects tested survived being packed in a carbon dioxide or nitrogen atm. and held for periods ranging from 4 to 14 days. Many C. maculatus survived vacuum and gas treatments when polyethylene film was used as packaging material. Control failures also occurred when pouches were punctured either by the commodity or by insects. AS

Packaging materials

Plastics

1352 Murthy (RAN) and Veerraju (P). Safety evaluation of plastics materials for food packaging applications. ISI Bulletin 2(12); 1989; 509-514

The review covers aspects like composition and evaluation of finished plastics material intended for food contact; standards and regulations for food packaging plastics; tests for toxicity, including extraction test and global migration test; some ambiguities observed in specification and test methodology; and the parameters to be observed while assessing the safety of plastics. A brief statement is also given about the survey report on plastics packaging materials for food contact applications conducted by the Industrial Toxicology Research Centre, Lucknow, India, during 1983-87. 19 references. KAR

FOOD ENGINEERING AND EQUIPMENT

Engineering

1353 Ofoli (RY) and Komolpraskert (V). On the thermal modeling of foods in electromagnetic fields. Journal of Food Processing and Preservation 12(3); 1988; 219-241

1354 Rao (VNM) and Webb (KS). Flow parameters for non-Newtonian foods using a co-axial cylinder viscometer. Journal of Food Processing and Preservation 12(3); 1988; 243-249

1355 Tan (CS) and Ling (AC). Effect of non-uniform heat transfer through can surfaces on process lethality of conduction heating foods. Canadian Institute of Food Science and Technology Journal 21(4); 1988; 378-385

1356 Wells (JH) and Paul Singh (R). Response characteristics of full-history time-temperature indicators suitable for perishable food handling. Journal of Food Processing and Preservation 12(3); 1988; 207-218

Time-temp. indicators manufactured by LifeLines Technologies (models 21, 34, and 57) and I-POINT Biotechnologies (models 2140, 2180, and 2220) were stored at 0, 5, 10, 15, 20, 25 and 37 C. The response of the LifeLines model 57 and I-POINT model 2180 indicators were compared to the manufacturers data and found to be in good agreement. Indicator responses were documented for the constant temp. exposures, and modeled with a first-order kinetic equation. The effect of temp. on indicator response was described according to the Arrhenius relationship, and the activation energies for the LifeLines indicators were found to range from 17.8 to 21.3 kcal/g-mole, and from 14.0 to 14.3 kcal/g-mole for the 1-POINT indicators. AS

ENERGY IN FOOD PROCESSING

Solar energy

1357 Katre (BC) and Sitaram Prasad). Utilization of solar energy in pasteurization process. Indian Dairyman 41(5); 1989; 251-253

In dairy industry, the steam requirement for cleaning, sanitization, pasteurization, sterilization, and ghee making operations vary from 2.0 to 3.0 kgf/cm^2 and in such conditions use of medium sized boiler becomes expensive. To overcome this the author suggests the use of modified steam generation system which uses condensate and also utilizes solar energy. KAR

FOOD CHEMISTRY AND ANALYSIS

Chemistry(Analytical)

1358 Padalikar (SV), Shinde (SS) and Shinde (BM). Specific spray reagents for the detection of carbaryl by thin-layer chromatography. Analyst 113(11); 1988; 1747-1748

Two specific spray reagents for the detection of the commonly misused carbamate insecticide carbaryl have been developed. vis,. (i) 1% m/V copper (ii) chloride followed by 0.1% ammonium metavanadate and (ii) 0.5% m/V potassium hexacyanoferrate (iii) in 0.5% m/V sodium hydroxide. The former reagent has relatively higher sensitivity for the breakdown product of carbaryl, 1-naphthol, 1-naphthol, whereas the latter has the same sensitivity for both carbaryl and 1-naphthol, ca. 1 μg. AS

FOOD MICROBIOLOGY AND HYGIENE

Enyzmes

1359 Koch (M) and List (D). Determination of isocitrate by means of an immobilized-enzyme reactor. Deutsche Lebensmittel-Rundschau 84(10); 1988; 313-317 (De).

Isocitrate-dehydrogenase (EC 1.1.1.42) was covalently attached to Eupergit C (Rohm Pharma, Weiterstadt). Use of lyophilized enzyme and the immobilization at pH 7.4 on a very thin carrier layer led to a preparation with a load of 88 mg enzyme per g dry carrier. The immobilized enzyme was used in a packed-bed reactor integrated into a continuous flow system driven by a HPLC-pump, the reduced coenzyme was photometrically detected at 340 nm. The enzyme containing reactor gave complete substrate conversion (99.9%) over a wide range of flow rates, and conducted high performance stability. More than 140 MUmol isocitrate were converted which is at least equivalent to 20000 triple determined tests. Linearity, detn. limit, precision and sample carry-over were investigated. The described method was found to be suitable for automated detn. of isocitric acid in orange, grapefruit and raspberry juice. Results from this method were compared to those by the reference method. AS

Ethyl alcohol

1360 Shama (G). Developments in bioreactors for fuel ethanol production. Process Biochemistry 23(5); 1988; 138-145

The review covers aspects of the design and operation of bioreactors for the production of ethanol for use as a fuel. This covers bioreactor configuration, yeast cells retention, ethanol inhibition, solid substance fermentations and conclusions. NGKR

Microorganisms

1361 Senemaud (C) and Mangeot (G). Microorganisms and fruit aroma. Flussiges Obst 55(12); 1988; 714-723 (De).

Bacteria

1362 Babu (KS), Singh (RS) and Chander (H). Effect of antibiotic resistance on the flavour profile of lactic acid bacteria. Journal of Dairy Research 56(1); 1989; 155-157

The paper relates to the development of antibiotic resistance among 5 strains of Streptococcus lactis biovar. diacetylactis (S_7 - S_{11}) and 6 strains of Lactobacillus delbrueckii subsp. bulgaricus (L_1 - L_6) isolated from market dahi samples, and these cultures are used for the preparation of fermented milk products. With strains S_7 - S_{11}, a significantly lower level of diacetyl was obtained in penicillia and streptomycin resistant cultures. Penicillin-resistant derivatives of strains L_1 - L_6 showed almost 50% reduction in acetaldehyde production compared with parent cultures, while streptomycin resistant cultures exhibited appreciable depression in flavour production. Penicillin as compared to streptomycin may have drastic effects on the activities of lactic cultures. However, the amount of diacetyl and acetaldehyde produced by the respective resistant isolates of S7 - S_8 and L_1 - L_6 may be adequate to five proper flavour characteristics to the fermented dairy product. MCV

Bacillus licheniformis

1363 Bajpai (P) and Bajpai (PK). High-temperature alkaline Alpha-amylase from Bacillus licheniformis TCRDC-B13. Biotechnology and Bioengineering 33(1); 1989; 72-78

A bacterial strain, Bacillus licheniformis has been isolated and identified which produces high-temp. alkaline Alpha-amylase. Cultural conditions, such as type of carbon and nitrogen sources, temp., pH, and time of reaction, have been optimized for production of Alpha-amylase in shake flask and fermenter. The enzyme produced was quite active even at 100 C, however, it showed optimum activity at 90 C. It exhibited optimum activity in the broad pH range 5.5-10.0. The effects of Na+ and Ca^{2+} ions on enzyme activity was also studied. AS

Escherichia coli

1364 Berrocal (CI), Murillo (R), Berrocal (L) and Perez (JL). A reliable and economical scheme for detection of Escherichia coli in foods. Revision of McKenzie's test. Revista de Agroquimica y Tecnologia de Alimentos 27(4); 1987; 569-574 (Es).

McKenize's test was evaluated as a method of detection of Escherichia coli in food samples. Faecal coliforms and indole production at 44.5 C (McKenzie's test) were determined in 364 positive coliform detn. Moreover, a search of the presence of lactose-fermenting, indole-producer Gram negative bacilli in 238 positive coliform detn. was carried out, in order to detect the possible interference in McKenzie's test. A scheme based on the isolation on McConkey agar and subsequent identification of E. coli by means of Beta-glucuronidase (McC/Beta-GUR) was also evaluated. A total of 79 E. coli strains were isolated, 70 of which were detected by the faecal coliform method and 72 by indole production. In six instance, E. coli was only detected by indole production, and in three additional instances, only by the McC/Beta-GUR scheme. According to these results, a double scheme is proposed: McKenzie's test to quantify of E. coli and the system McC/Beta-GUR as an accurate method for detection and identification. All together, this is a simple, rapid and economical scheme. AS

Streptococcus salivarius

1365 Bracquart (P), Le Deaut (J-Y) and Linden (G). Uptake of glutamic acid by Streptococcus salivarius subsp. thermophilus CNRZ 302. Journal of Dairy Research 56(1); 1989; 107-116

Importance of glutamic acid in necessiating vigorous growth of Streptococcus salivarius subsp. thermophilus is to be established in relation to its entry into the cell and also to determine the relationship with asparatic acid, an excess of which is inhibitory to growth of this organisms in milk. Glutamic acid uptake in Str. thermophilus was energy dependent, the source of energy and adoptation to sugar being important to efficiency of uptake. The disaccharides, lactose and sucrose, stimulated uptake, but cells grown, in glucose were more active. Optimum temp. was 40 C and pH 7.0. NaCl was strongly inhibitory to the uptake of glutamic acid although not to that of isolaucine. High specificity existed because only L-aspartic acid was inhibitory. Presence of glutamic acid is sublimiting, an excess of aspartic acid saturates the entry sites and partly inhibits growth. MCV

1366 Chang (B-S) and Mahoney (RR). Purification and thermostability of Beta-galactosidase (lactose) from an autolytic strain of Streptococcus salivarius subsp. thermophilus. Journal of Dairy Research 56(Q); 1989; 117-127

Beat-Galactosidase from an autolytic strain of Streptococcus salivarius subsp. thermophilus was purified 109-fold to near homogeneity. The yield of purified enzyme was 41% and the specific activity was 592 o-nitrophenyl Beta-D-galactopyranoside u/mg at 37 C. Two isozymes were present, but only one subunit was detected, having a mol. wt. of 116000. Enzyme stability was 37-83 times greater in milk than in buffer in the range 60-65 C. At 60 C the half life in milk was 146 min. Denaturation in buffer was first order, but in milk the overall reaction order with respect to enzyme concn. was 0.5. The activation energy for denaturation was 453 kJ mol in milk and 372 KJ mol in buffer. In milk the activation energy for lactose hydrolysis was 35.1 KJ/mol. AS

Fungi

Mushrooms

1367 Rajarathnam (S) and Bano (Z). Pleurotus mushrooms. Part III. Commercial applications and implications. CRC Critical Reviews in Food Science and Nutrition 28(1; 1989;

This review discusses the various biological changes brought about in the lignocellulosic substrates while culturing Plueurotus as well as the possible and probable mechanisms of degradation and utilisation of spent substrates. This covers lignocellulosic wastes chemical changes in growth substrates, biochemical changes, applications and implications of biochemical properties of Pleurotus and critical considerations. NGKR

1368 Tomasicchia (M), Andreotti (R) and Berneri (C). Study of the preservation of cultivated mushrooms in brine. Industria Conserve 63(2); 1988; 117-122 (It).

Tests on the preparation of brined cultivated mushrooms, Psalliota campestris, were conducted in order to improve product yield and quality and to evaluate the possibility of preserving this kind of mushrooms in low-salt brines (< 15% NaCl) by addition of citric and/or acetic acid. Soaking the fresh mushrooms in water was found to reduce wt. losses during subsequent processing, while fermentation adversely affected the flavour and firmness of the mushrooms and increased wt. losses. The addition of both acids, citric and acetic, proved necessary to preserve the mushrooms in low-salt brines (10% NaCl). A processing scheme for the preparation of brined cultivated mushrooms is proposed. AS

1369 Verma (A), Keshwewani (GP), Sharma (YK), Keshwal (RL) and Pratibha Singh. Nutritional evaluation of dehydrated mushrooms. Indian Journal of Nutrition and Dietetics 24(12); 1987; 380-384

In this study three types of mushroom (Agaricus bisporus, Pleurotus sajor caju and Volvariella volvacea) were analysed (full fruit, cap and stipe separately) for its biochemical constituents. The results showed that mushroom is a good protein source as it contains essential amino acids similar to that found in animal proteins. They are found to be rich in protein but poor in oil and good quantities of ash, carbohydrate, fibre are present. A. bisporus was found to be superior in NPN, starch and P. sajor caju in protein, total carbohydrate total sugars, while V. volvacea in ash and crude fibre content. In all var. cap had higher nutrients as compared to stipe. In case of V. volvacea cap it contained less crude fibre than stipe whereas cap of P. sajor caju had less carbohydrate and cap of A. bisporus had less carbohydrate and reducing sugar content as compared to stipe. KAR

Yeasts

1370 Liu (L-C), Prokopakis (GJ) and Asenjo (JA). Optimization of enzymatic lysis of yeast. Biotechnology and Bioengineering 32(9); 1988; 1113-1127

In enzymatic lysis of yeast for the recovery of intracellular proteins, the rupture of whole cells is caused by the action of a lytic system consisting primarily of protease and glucanase. A first-principles mechanism for the lytic reaction based on a two-layer model of the wall structure and a burst model for the disruption of cells is presented. The fed-batch model results in a dynamic optimization problem, with the enzymes, activities being the control variables. Orthogonal collocation is applied to discretize the state equations, and the resulting non-linear program is solved using successive quadratic programming to determine the enzyme and protease inhibitor add-in rates and pH control profiles that maximize the recovery of intracellular protein. Applying the proposed approach, optimal profiles were determined such that a significant increase of the production of proteins in a fed-batch reactor is realized. Also, the optimal control policies in a series of continuous-flow-stirred tank reactors (CFSTRs) are determined. AS

Hygiene

1371 Bryan (FL). Risks or practices, procedures and processes that lead to outbreak of food borne diseases. Journal of Food Protection 51(8); 1988; 663-673

Factors responsible for outbreaks of food borne diseases reported in the U.S. from 1977-1982 combined with data from the yrs. 1961-1976 have been identified, classified by disease and place where implicated foods were mishandled have been reported. These factors are vital items to stress in food safety programs. CTD

BIOTECHNOLOGY

1372 Mohr (KH) and Schulze (R). Membrane separation processes in food technology and biotechnology. Part II. Lebensmittelindustrie 35(6); 1988; 244-249 (De).

Deals with microfiltration, the ultrafiltration and the reverse osmosis. BV

1373 Sharma (SC) and Mathur (BN). Perspectives in biotechnological engineering fermentation systems and processes. Indian Dairyman 40(12); 1988; 671-677

In biotechnological engineering fermentation occupies important position. This article reviews in brief the fermentation system, operation of the fermenter, and the fermentation process, product recovery from the fermenter, principles involved in the design of fermenter and the process control in fermentation. 5 references. KAR

TISSUE CULTURE

Nil

FOOD ADDITIVES

1374 Muller-Spath (H). Flavour development by carbon dioxide. Flussiges Obst 55(12); 1988; 700-703 (De).

Acidulants

1375 Dall' Aglio (G), Gola (S), Versitano (A) and Quintavalla (S). Use of glucono-Delta-lactone as acidulant in canned foods. Industria Conserve 63(2); 1988; 123-126

Glucono-delta-lactone is permitted in Italy only as acidulant in bakery products. However, for its physico-chemical characteristics this compound could also replace conventional organic acids in the preparation of canned vegetables, with, in many cases, appreciable advantages due to the less sourish taste of the finished product. The concn. of glucon-delta-lactone necessary to lower the pH of a vegetable to 4.5 or less varies from 1.2 for vegetables rich in starch to 0.5% for those rich in cellulose and 0.7% for those with intermediate characteristics. AS

Stabilizers

Gums

1376 Baiodon (S), Fiszman (SM), Costell (E) and Duran (L). Syneresis in agar and in Kappa-carrageenan gels. Effects of the addition of carob bean and guar gums. Revista de Agroquimica y Tecnologia de Alimentos 27(4); 1987; 545-555 (Es).

The extent of the syneresis occurred in agar (AG) and kappa-carrageenan gels (KG) at several total concn. (1.0 less than or equal to % agar less than or equal to 1.75; 0.5 less than or equal to % carrageenan less than or equal to 1.5) and with different proportions of carob bean gum (CBG) (25, 50 and 75%) have been studied. An increase in the proportion of CBG always produced a linear decrease in the degree of syneresis. This decrease depend not only on the CBG proportion but also on the total hydrocolloids concn. since the interaction between both effects was significant (P less than or equal to 0.01) both in AG and in KG. The effect of the CBG proportion is bigger at lower total hydrocolloids concn., differences being higher in AG. When in 50% gum gels, a 1:1 mixture of CBG and guar gum is used instead of only CBG, decrease of syneresis was bigger, this difference being significant only in KG. The effect of the addition of these gums on gel strength was also studied. AS

Pectins

1377 Hyde-Smith (JJ). Pectin-The fruit-based additive. 2. Jams, bakery products and sugar confectionery. Food Trade Review 58(10); 1988; 577-579

Sweeteners

1378 Nauta (VSD) and Sancineti (GC). Artificial sweeteners as an alternative to sugar. Current status and prospect. Industrie Alimentari 27(261); 1988; 513-517, 524 (It).

Although using sweeteners has become a habit for a great number of consumers, the regulations concerning them are still quite limited and different in the various countries so that it is necessary to reorganize them. Within the European Economic Community, for instance, unified regulations exist only for some types of caloric sweeteners (glucose, fructose and their syrups, etc.) whereas there are none for low-calorie and calorie-free sweeteners (saccharine, cyclamate, aspartame, acesulfame K, etc.). The EEC regulations concerning the characteristics, supply and distribution of such sweeteners are expected to be unified by 1922. In this paper the current situation existing in the 12 members EEC and in other European countries has been examined. Particular reference has been made to the situation in Italy. AS

CEREALS

1379 Lepage (CA), Gordon (J) and Davis (EA). Physical analysis of isolated gluten model systems heated in an experimental conventional microwave oven. Cereal Chemistry 66(1); 1989; 33-38

The response of rehydrated isolated gluten systems, before and after hexane extraction, to microwave and conventional heating on physical properties was determined. Free and bound lipids, osmian to S and P to S ratios were not changed by extraction. The rate of water loss from rehydrated gluten samples heated to 200 C showed a local max. as surface temp. approached 110 C, followed by rates of water loss as internal temp. stabilized at 100 C. Whereas, the local water loss rate max. was absent in microwave heated sample. The water loss rates increased till the constant or falling rate period was reached. The surface and internal temp. increased at similar rates and set stabilized at 100 C. AR

1380 Tanaka (T), Hasegawa (A), Yamamoto (S), Lee (US), Sugiur (Y) and Ueno (Y). Worldwide contamination of cereals by the Fusarium mycotoxins nivalenol, deoxynivalenol, and zearalenone. 1. Survey of 19 countries. Journal of Agricultural and Food Chemistry 36(5); 1988; 979-983

By a rapid and sensitive method for simultaneous detection of nivalenol (NIV) deoxynivalenol (DON; vomitoxin), and zearalenone (ZEN), toxic metabolities of Fusarium sp., their natural occurrance in cereals, foods, and feeds sampled from 19 countries was surveyed. Wheat, barley, oat, rye, corn, rice, and their products, in totaling 500 samples, were positive for NIV, DON, and ZEN in 244, 223, and 219 samples, through their contents varied depending on the commodities and sources. This is the first paper demonstrating the worldwide contamination of NIV, DON, and ZEN in agricultural products. AS

1381 Wieser (H), Seilrneier (W) and Belitz (HD). Reversed phase high performance liquid chromatography of ethanol soluble and ethanol insoluble reduced glutenin fractions. Cereal Chemistry 66(1); 1989; 38-41

Glutenin was extracted with 70% aqueous ethanol in the presence of dithioerythritol. RP-HPLC and SDS-PAGE showed that the ethanol soluble fraction contained MMW (middle mol. wt.) glutenins and the insoluble fraction contained the HMW subunits. LMW glutenins were found in both the fractions. Among the four var. analyzed, HMW patterns of insoluble fractions were correlated to baking quality, where as the HPLC patterns of the soluble fractions were unique to each var. AR

Rice

1382 Buttery (RG), Turnbaugh (JG) and Ling (LC). Contribution of volatiles to rice aroma. Journal of Agricultural and Food Chemistry 36(5); 1988; 1006-1009

The odour thresholds in water solution of 64 known rice volatiles are listed and compared. Compounds with the lowest odour thresholds (T) include (E,E)-2-4-decadienal (T = 0.07 p.p.b.), (E)-2-nonenal (T = 0.08 p.p.b.), and 2-acetyl-1-pyrroline (T = 0.1 p.p.b). Data from quantitative analysis (using a Tenax trap isolation method) of the major volatiles in cooked California long-grain rice were used to determine the ratio of each compound's concn. in the cooked rice to its odour threshold (odour unit value). This indicated that the probable major contributors to the Californian long-grain cooked rice odour included 2-acetyl-1-pyrroline, (E,E)-2-4-decadienal, nonanal, hexanal, (E)-2-nonenal, octanal, decanal, 4-vinylguaiacol, and 4-vinylphenol. AS

1383 Lee (S-J) and Pelag (M). Direct measurment of the attractive force between individual cooked rice grains of sticky and flaky cultivars. Journal of Food Science 53(4); 1988; 1113-1115

The attractive force between juxtapositioned cooked rice grains of five sticky and flaky cvs was determined using a surface tensiometer. The attractive force between the sticky grains was in the order of 800-1700 dynes and between the flaky ones, 200-1000 dynes. Increase of the water-to-rice ratio during cooking, in the range 0.75; 1 to 1.9:1, resulted in an increase of the attractive force. Detn. of the amount of solids extracted during cooking in excess water indicated that stickiness was most probably associated with extractability. AS

1384 Singaravadivel (K) and Anthoni Raj (S). Reprocessing of infected parboiled rice (Oryza sativa). Indian Journal of Agricultural Sciences 58(10); 1988; 766-769

Direct milling of 'Adt 31' parboiled rice infected by Aspergillus flavus, Asp. fumigatus and Mucor mucedo gave only 53.5% milled rice and reduced the oil content in bran to 13.8% with 40.6% free fatty acid in the oil. Infected parboiled rice was reprocessed by (i) steaming, (ii) wetting and steaming, (iii) 12 h soaking and steaming and (iv) 24 h soaking and steaming which increased the head rice yield to 68.4, 94.7, 94.6 and 91.6% and increased the oil content to 21.9, 27.9, 30.0 and 31.6%. Whereas free fatty acid contents were 23.1, 25.5, 22.5, and 27.1% resp. Similar reprocessing of IR 20 parboiled paddy which was subjected to 3, 4 and 7 days of non-drying also gave improved head rice yield depending upon the initial mould infection; max. head rice yield was obtained when the reprocessing was done by 6 h soaking and steaming for those parboiled rice which was non-dried for > 4 days. KAR

Triticales

1385 Anthiewicz (P). Triticale in malting. Acta Alimentaria Polonica 13(2); 1987; 91-97

Grain and malts from winter and spring triticale var. were subjected to standardized investigation. A particularly interesting feature of the considered malts was high amylolytic activity, much greater (1.5-2.4-fold) than in standard malt. The inferior qualities of these malts included excessive protein content, too low germination energy and susceptibility to mould growth during malting. AS

1386 Saini (HS) and Henry (RJ). Fractionation and evaluation of triticale pentosans. Comparison with wheat and rye. Cereal Chemistry 66(1); 1989; 11-14

The pentosan content of six var. of triticale was compared with two var. of wheat and two of rye. Pentosans were fractionated into those soluble in cold water, hot water, ammonium oxalate/ethylene diamine tetraacetic acid, 5% NaOH, 15% NaOH, and residue fractions. The pentose content of fractions was determined by acid hydrolysis, conversion of monosaccharides to alditol acetates, and gas chromatography. Total pentose (arabinose + xylose) recoveries in all fractions averaged 12.2% for rye, 7.4% for triticale, and 6.6% for wheat. These values were higher than those obtained by direct analysis of whole grain. About half of the pentosan was in the 5% NaOH soluble fraction. The residue fraction contained a much higher proportion of arabinose. The higher pentosan content of triticale may contribute to its nutritional quality being inferior to that of wheat. AS

Triticale starch

1387 Gambus (H), Fortuna (T), Nowonta (A) and Palasinski (M). Physical properties of triticale starch. Part II. Water binding capacity and solubility of starch. Acta Alimentaria Polonica 13(2); 1987; 99-106

Starches isolated from 53 Polish triticale breeding lines were tested for water binding capacity (WBC) and solubility. It was shown that these starches display two-stage curves of WBC and solubility. Among the investigated samples, seven triticale lines exhibit higher solubility which is apparently due to previous hydrolysis. AS

1388 Gambus (H), Fortuna (T), Nowonta (A) and Palasinski (M). Physical properties of triticale starch. Part III. Termination of flow curves of triticale starch pastes. Acta Alimentaria Polonica 13(2); 1987; 107-113

Flow curves of pastes from 53 Polish triticale breeding lines were investigated. Rheological parameters of those pastes, viz. constants "n" and "k" of the power equation, were determined. Seven starches can be distinguished among all the samples, their pastes possessing properties of the Newtonian liquid. AS

1389 Gambus (H), Fortuna (T), Nowotna (A) and Palasinski (M). Physical properties of triticale starch. Part. I. Characteristics of starch pasting. Acta Alimentaria Polonica 13(1); 1987; 3-13

The phsyico-chemical properties of potato, wheat and maize starch, native and modified according to three methods, were studied. It was found that mild acid or enzymatic hydrolysis resulted in an increased temp. of starch pasting, a reduction of paste viscosity, and an increase of gel syneresis after defreezing. The physico-chemical changes brought about by phosphate modification were opposite to those induced by the acid and enzymatic modification. Studies of three fractions of potato starch differing in granule size showed that the changes due to modification increase with the decrease of av. granule size. AS

Wheat

1390 Al-Mashhadi (A), Naeem (M) and Bashour (I). Effect of fertilization on yield and quality of irrigated yecora rogo wheat grown in Saudi Arabia. Cereal Chemistry 66(1); 1989; 1-3

Gross composition and rheological properties of flour from Yecora Rojo wheat grown under 12 different fertilization programs were investigated. A split-plot experiment of N and P fertilizer combinations with Fe, Zn, Cu, and Mn was conducted in a calcareous loamy soil in Al-Kharj. Saudi Arabia. Total applied rates were 125, 250, and 350 kg of N/ha, and 125 and 250 kg of phosphorus pentaoxide/ha. The 250 kg N/ha and 125 kg phosphorus pentaoxide/ha were sufficient to produce the highest yields. Addition of nitrogen ncreased the yield and the protein content. None of the treatments, however, affected adversely the flour milling yield, gross composition, and rheological properties. AS

1391 Baruch (DW) and Atkins (TD). Using the Wheat Research Institute Chomper to assess crumb flexibility of staling bread. Cereal Chemistry 66(1); 1989; 59-64

Experiments were performed to assess the performance of the Wheat Research Institute Chomper in evaluating bread staling. The Chomper produces a dynamic stress-strain curve, the chompergram. The peak height of the chompergram appears to indicate the strength of the gluten matrix of crumb. The initial slope of the chompergram provides a measure of crumb flexibility. These two parameters were found to be useful in assessing the staling of bread with respect to storage time, position of the samples in the loaf, and type of dough conditioner used. Chompergram slope increased with storage time, whereas peak height decreased with storage time. A unique finding that peak heights generally mirror chompergram slopes may support theories of water migration between gluten and starch fractions. The mechanical model proposed for the action of the chompergram was supported by the results of this study, in particular by the results obtained for Poisson's ratio. AS

Wheat bran

1392 Moller (ME), Dahl (R) and Beckman (OC). A possible role of the dietary fibre product, wheat bran, as a nitrite scavenger. Food and Chemical Toxicology 26(10); 1988; 841-845

Wheat bran acted as a nitrite scavenger under conditions similar to those that exist in the stomach. Wheat flour and cellulose did not act as nitrite scavengers. Wheat bran, at a concn. equivalent to that in the stomach after ingestion of about two pieces of whole-wheat bread, reduces the nitrite concn. from 20 MUM to about 10 MUM in 60 min at pH 3.5 and 37 C. At pH 2.5 and 1.5, most of the nitrite had disappeared in 10 min. At pH less than or equal to 2.5 the nitrite scavenging effect of bran was as efficient as that of ascorbic acid. Ferulic acid, a component of bran, reacted rapidly with 20 MUM nitrite both at pH 3.5 and 1.5, whereas phenolic lignin model compounds only reacted at pH 1.5. AS

Wheat flour

1393 Weegels (PL), Marseille (JP) and Hamer (RJ). Small scale separation of wheat flour in starch and gluten. Starch/Starke 40(9); 1988; 342-346

A system was designed to imitate on a small scale the separation process of wheat into starch and gluten. The system provides information on gluten coagulation, on yield, purity and recovery of gluten and starch, and on losses of soluble protein and other soluble matter in waste water. The performance of the system is demonstrated with the results of the separation of four wheat var. of different baking quality. Using these results the accuracy, reproducibility and resolution of the system are discussed. AS

MILLETS

Corn

1394 Eckhoff (SR) and Okos (MR). Diffusion of gaseous sulphur dioxide into corn grain. Cereal Chemistry 66(1); 1989; 30-33

The diffusion path or gaseous sulphur dioxide into sound yellow dent corn was explored. The iodine-staining procedure used gave qualitative indication that the sulphur dioxide enters primarily through the tip cap in whole intact kernels. The sulphur dioxide enters at the tip cap, moves up through the area between the pericarp and seed coat, and then diffuses into the endosperm. A second pathway up through the germ into the endosperm was also observed. Complete penetration gaseous sulphur dioxide into the kernel can be achieved in about 2 min. Damage to the pericarp increases the amount of sulphur dioxide taken up by the grain. AS

1395 Goossens (J), Derez (F) and Bahr (KH). Presence of starch protein aggregates in the endosperm of corn. Starch/Starke 40(9); 1988; 327-

333

The presence of so called "grits" and other structures in process streams of the corn wet milling process leads to starch yield losses by incomplete starch/gluten separation. The nature of these problematic structures was investigated by isolating them from the process streams and analysing their morphology by means of epifluorescence microscopy using specific dyes. Additional evidence was obtained by specific enzymatic degradation and subsequent microscopic observation. Using the same technique on thin cross sections from whole corn kernels, the location and source of these structures could be identified. Grits are dense particles from the horny endosperms, consisting of a three dimensional honeycomb-like protein matrix filled with small starch granules. Many grits show the regular cell shape found in endosperm cells and are still enclosed by the fibrous cell wall. In other process streams, aggregates of protein lumps with trapped large and small starch granules occur frequently. A small fraction of fibrous material was also found to be enclosed in the protein matrix. These "sticky" aggregates often occur along with a large percentage of extremely small starch granules or fragments. Occasionally, very small "grits" like particles were present. Based on these findings, explanations can be found for the loss of starch and for the difficulties in the starch-gluten separation stage in the industrial corn wet milling process. AS

1396 Izzo (MT) and Ho (C-T). Protein-lipid interaction during single-screw extrusion of zein and corn oil. Cereal Chemistry 66(1); 1989; 47-51

Protein-lipid interaction in extruded model systems of zein and corn oil was investigated by analysis of lipids available to solvent extractions. Samples were extrusion cooked at barrel temp. of 120 and 165 C with and without added corn oil. Two extraction methods were utilized, precipitation of solubilized extrudate into ethyl ether and slurrying of ground extrudates with hexane or ether. Extracts were then subjected to high-performance liquid chromatographic lipid class analysis. Both methods indicated a decrease in extractable lipid after extrusion cooking. Slurry extraction revealed triglyceride and diglyceride binding, whereas the more harsh extraction by precipitation was able to detect binding of fatty acid. Both methods showed protein-lipid interaction was not increased by elevating the temp. to 165 C, suggesting that heat favoured reactions did not predominate. Noncovalent interaction appeared to cause the decrease in lipid extractability. AS

1397 Mundy (KJ), Godber (JS), Dabney (SM) and Rao (R). Processing characteristics of long-grain rice grown under sprinkler or flood irrigation. Cereal Chemistry 66(1); 1989; 41-46

Processing quality characteristics of three different long-grain rice cvs.(`CICA-8', `Labelle', `Lemont') grown under three water management regimes (flood, sprinkle when soil matrix potential (SMP) was less than -0.2 bar, sprinkle when SMP was less than -0.5 bar) were tested. Brown rice yields varied between cvs. but were not affected by water management. Milling yields were higher in flooded rice than sprinkler-irrigated rice, but effects within cvs. were variable. Total milled yields were higher for `Labelle' and `Lemont' than for `CICA-8'. Amylose content, which ranged between 26.6 and 29.7% was not affected by cvs or water management. Amylograms indicated that `CICA-8' had higher viscosity values, less breakdown, and greater setback than `Labelle' and `Lemont'. `CICA-8' was judged to have lower sensory quality in a rice pudding for the attributes of texture, moisture, and acceptability. There was no overall effect of water management on sensory attributes, but sprinkler-irrigated `Labelle' was judged higher than flood-irrigated `Labelle' for the attributes of texture and consistency. AS

1398 Samron (PR) and Parker (RJ). Laboratory studies on protectants for control of coleoptera in maize. Journal of Stored Products Research 25(1); 1989; 49-55

The effectiveness of nine protectant compounds was assessed on maize of 14% moisture content stored at 30 C. The order of potency of freshly-applied residues of organophosphorus compounds against multiresistant Tribelium castaneum (Herbst) and Sitophilus oryzae (L). was chlorpyrifos-methyl > pirimiphos-methyl > methacrifos > fenitrothion Chlorpyrifos-methyl was also the most potent compound against susceptible S. zeamais Motschulky. The order of potency of synthetic pyrethroids bioresmethrin > D-phenothrin. Min. effective application rates for desired periods of protection depended on each protectant's inherent potency and on the rate at which its effectiveness was lost during storage, the latter seeming to correlate with published rates of chemical breakdown. For most protectants, application rates that have proved successful on wheat in Australia should also work on maize. Probable exceptions are methacrifos and deltamethrin (unsynergised) which used alone did not control R. dominica and Sitophilus sp. resp., at resistic rates. The remaining compounds would be used in combination. Against T. castaneum, fenitrothion (12mg/kg^{-1}) and pirimiphos-methyl (4 mg kg^{-1}) completely prevented progeny for 3 and 9 months, resp. although allowing some adult survival, and chlorpyrifos-methyl (10 mg/kg^{-1}) completely presented progeny and killed adults of S. oryzae for 4.5 months. Against R. dominica, deltamethrin (0.04 mg/kg^{-1}) fenvalerate (10.25 mg/kg^{-1}) and permethrin (0.5-1 mg/kg^{-1}) gave complete protection for 9 months, but higher application rates were required using bioresmethrin and D-phenothrin. AS

1399 Starratt (A (N) and Bond (EJ). Methylation of DNA of maize and wheat grains during fumigation with methyl bromide. Journal of Agricultural and Food Chemistry 36(5); 1988; 1035-1039

The possibility that methylation of DNA occurs during fumigation of foodstuffs with methyl bromide was investigated in two grains, maize and wheat, using ^{14}C - labeled fumigant. 7-Methylguanine and 1-methyladenine were identified as major products along with lesser amounts of 3-methylcytosine and 3-methyladenine. 3-Methylguanine was probably also formed in minor amounts. Although less than 1% of the bound radioactivity was associated with the DNA isolated, the results indicated that 0.5-1% of the guanine residues in the DNA of these grains was methylated during treatment with 48 mg/L methyl bromide for

72 h. AS

1400 Takeda (C), Takeda (Y) and Hizukuri (S). Structure of amylomaize amylose. Cereal Chemistry 66(1); 1989; 22-25

The molecular structures of three var. of amylomaize amyloses, and their Beta-limit dextrins were analyzed by chemical end-group detn. high-performance liquid-gel chromatography with a small-angle laser-light-scattering photometer and differential refractometer and enzymic analyses. The results suggested that the structures of amyloses from amylomaize starches with apparent amylose contents of 48, 54 and 68% closely resembled each other. The amyloses were small molecules of 690-740 number-average degrees of polymerization (dp_n), and 1.810-1,990 wt. -average dp_w with chain lengths of 215-255, and their apparent dp distribution were 200-9,000. They comprised large branched molecules, with 5-6 chains on average, and small unbranched molecules in an almost equimolar ratio. AS

1401 Zayas (JF) and Lin (CS). Water retention of two types of hexane-defatted corn germ proteins and soy protein flour. Cereal Chemistry 66(1); 1989; 51-55

Water retention properties of two hexane-defatted corn germ protein (CGP) preparations processed by a modified and a conventional procedure and soy protein flour were studied in model systems and analyzed using response surface methodology. The protein preparations had different fat and protein content. The defatted CGP obtained by the modified process was whiter, less red, and less yellow than defatted CGP processed conventionally and was similar in colour to soy protein flour. Increased temp. of incubation in the range 5-80 C enhanced the water retention of both CGP preparations. Time of incubation (10-30 min) and pH of solution (pH 6-7) did not affect water retention. Defatted CGP- obtained by the modified process had higher water retention (2.04) at low incubation temp. than that processed by conventional procedure (1:49). Time and temp. of incubation and pH had no significant effect on the water retention of soy protein flour. Soy flour had higher water retention than defatted CGP at temp. lower than 55 C due to its higher protein content. AS

Corn starch

1402 Steffe (JF), Castell-Perez (ME), Rose (KJ) and Zabik (ME). Rapid testing method for characterizing the rheological behaviour of gelatinizing corn starch slurries. Cereal Chemistry 66(1); 1989; 65-68

A mixer viscometer system was developed to evaluate the flow behaviour of corn starch slurries during gelatinization. An instrumental system involving a Brookfield RVTD viscometer and a modified Brookfield small sample adapter equipped with a flag impeller and a thermocouple was constructed. A double fluid bath system allowed the samples to be heated and cooled over the gelatinization temp. range. Results collected on a strip chart recorder, gave sample temp. and torque response as a function of time. Instrument sensitivity and data reproducibility were excellent, indicating that the instrument will provide a valuable rheological tool for the starch industry. AS

Ragi

1403 Kanchana (S) and Shurpalekar (KS). Influence of different fractions for ragi Eleusine coracana husk on the growth of albino rats. Nutrition Reports International 39(1); 1989; 35-41

In this investigation factors other than diet intake for effecting improvement in growth of husked rats such as the effect of addition of protein, neutral detergent fibre (NDF) and acid resistant hemicellulose (ARH) isolated from ragi (Eleusine coracana) husk on the growth of rats have been studied. The results showed that addition of destarched or deprotenized husk (8%) or isolated Protein (1.4%), neutral detergent fibre (4.8%) and ARH (0.2%) at levels present in 8% ragi husk to a semisynthetic diet had improved the growth of rats. The growth response in case of destarched husk was higher than deprotenized husk. Addition of 1.44 g protein isolated at the level present in destarched husk promoted a higher growth rate whereas addition of 0.4 g, the level present in deproteinized husk did not. Hence it was found that the additional amounts of protein contributed by destarched husk and the presence of ARH in the husk samples resulted in higher growth response in rats fed with ragi husk. NGKR

Sorghum

Sorghum starch

1404 Akingbala (JO), Gomez (MH), Rooney (LW) and Sweat (VE). Thermal properties of sorghum starch. Starch/Starke 40(10); 1988; 375-378

The differential scanning calorimeter (DSC) was used to measure thermal properties of sorghum starch and flour. DSC gelatinization temp. of 24 nonwaxy sorghum var. were: T_o (onset temp.): 71.0 plus or minus 1.0 C T_ρ (peak temp): 75.6 plus or minus 0.9 C and Te (end temp.): 81.1 plus or minus 1.1 C, resp. The gelatinization energies ranged from 2.5 to 3.96 cal/g. There were no consistent relationship between DSC gelatinization temp. or gelatinization energies and grain characteristics or physicochemical starch properties. DSC gelatinization temp. for nonwaxy, heterowaxy and waxy sorghum tended to increase as the number of waxy alleles (wx) increased. However, it appeared that at least a difference of two waxy alleles was required before differences in thermal properties of the sample were significant. AS

PULSES

1405 Hoover (R), Clouteri (L), Dalton (S) and Sosulski (FW). Lipid composition of field pea (Pisum sativum cv Trapper) seed and starch. Starch/Starke 40(9); 1988; 336-342

The total lipids in field pea seeds and refined starch were extracted by five aqueous/organic solvent systems and the greatest yield of total, neutral and polar lipids was obtained with hot n-propanol-water (3:1 v/v). Lipids extracted from field pea seeds represented 2.9% of the seed wt. and consisted of 43.2% neutral lipids. 3.2% glycolipids and 53.6% phospholipids. The major components of the three fractions were 70% triacylglycerol in neutral lipid, 28% esterified sterol glycoside in glycolipid and 55% phosphatidylcholine in phospholipid. The purified starch fraction contained 0.22% surface lipids and 0.09% internal lipids. The surface lipids were primarily sterol esters and free fatty acids while only free fatty acids were found in the internal lipids. The ability of lysophospholipids and fatty acids to complex with field pea starch was demonstrated by differential scanning calorimetry and X-ray diffraction, resp. AS

1406 Suzanne Nielsen (S), Deshpande (SS), Hermodson (MA) and Paul Schoott (M). Comparative digestibility of legume storage protein. Journal of Agricultural and Food Chemistry 36(5); 1989; 896-902

Native and heated legume storage proteins were digested with various proteinases. Gel electrophoresis patterns indicated that phaseolin (dry bean) was most resistant to digestion, vicilin (pea) was most susceptible, and glycinin and Beta-conglycinin (soybean) were intermediate in susceptibility to various proteinases. The native proteins were cleaved by trypsin and chymotrypsin in only limited areas of the molecule, but they were all readily degraded upon heating. N-Terminal sequence analysis of the major breakdown products from phaseolin digestion and hydrophilicity and surface probability detn. indicated that trypsin, chymotrypsin, and papain cleave native phaseolin near the center of the protein molecule at a hydrophilic region predicted to be on the surface. This region in phaseolin is highly homologous in sequence with hydrophilic regions in vicilin and Beta-conglycinin. AS

Black gram

1407 Tharanathan (RN) and Ramadas Bhat (U). Scanning electron microscopy of chemically and enzymatically treated black gram (Phaseolus mungo) and ragi (Eleusine coracana) starch granules. Starch/Starke 40(10); 1988; 378-382

Amylolysis of chemically-treated starch granules of black gram and ragi was followed colorimetrically and by scanning electron microscopy. From the percent hydrolysis values it was evident that oxidation with periodate resulted in considerable resistance, whereas urea treatment resulted in granule susceptibility towards in vitro amylolysis. The action of Alpha-amylase and/or glucoamylase on periodate oxidised black gram starch showed on SEM sufficient enlargement of the granules and hollow craters as well; whereas similar treatment on oxidised ragi starch resulted in folded, distorted and deformed granules. Treatment with 8M urea resulted in the total loss of characteristic granular shape and formation of so called amylopectin "sacs". Like waxy starches the latter showed an increase in enzymic activity. Particularly, the synergistic action of Alpha-amylase and glucoamylase on untreated starches virtually collapsed the granules, forming innumerable "flat" ribbon like fragments. AS

Carob beans

1408 Fiszman (SM), Baidon (S), Costell (E) and Duran (L). Functional properties of carob bean gum. Effects on compression resistance of both agar and kappa-carrageenan gels. Revista de Agroquimica y Tecnologia de Alimentos 27(4); 1987; 519-529 (Es).

In agar gels (AG) and kappa-carrageenan gels (CG) of several concn. (1.00-1.75% for AG and 0.50-1.50 % for CG) the effects on both rupture strength (Fmax) and deformability modulus (Eap) produced by substitution of these hydrocolloids with different proportions (5, 25, 50 and 75%) of carob bean gum (CBG) were studied. The Fmax variation as a function of CBG proportion showed a max. value at 25% proportion in AG and at 50% in CG. Eap values decreased when CBG proportion increased in both types of gels; the magnitude of this decrease was also influenced by total gel concn. since the interaction between these two factors was significant at P less than or equal to 0.01. These variations in the values of Fmax and Eap showed that addition of CBG induced important changes in the rheological behaviour of the studied gels. These results are discussed in relation with the existing theories on the possible structure of mixed gels. AS

Cowpeas

1409 Lu (JY) and Sanni-Osomo (E). A flour from fermented cowpeas. Properties, composition and acceptability. Journal of Food Processing and Preservation 12(3); 1988; 197-206

A fermented cowpea flour was prepared by fermenting dehulled beans in three vol. of water at 38 C for 48 h. After fermentation the beans were washed, dried then ground it into flour. The flour was acidic, and slightly greenish white in colour. The composition was 21% protein, 2.5% oil, 1.6% ash and 66.6% carbohydrate. It also contained 35 1.U. beta-carotene, 1.28 mg ascorbic acid, 1.03 mg thiamin and 0.64 mg pyridoxine. Nitrogen solubility index, water absorption and viscosity became greater after fermentation. Two products bread and chips, were prepared using unfermented and fermented cowpeas flour as an ingredient. The products containing unfermented cowpea flour were scored higher than the ones containing unfermented cowpea flour. African panelists gave higher scores than American panelists. AS

Dry beans

1410 Koehler (HH) and Burke (DW). Nutrient and sensory properties of dry beans (Phaseolus vulgaris L.) grown under various cultural conditions. Journal of Food Science 53(4); 1988; 1135-1138, 1198

Dry beans UI-114(`Pinto') and `Rufus' (Red Mexican) were field-grown under presence or absence of Fusarium root, rot, drought or optimum water, low or high N fertilization. Raw bean powder was analyzed chemically for proximate comp., minerals, vitamins and amino acids, and by Tetrahymena pyriformis W for protein quality. Cooked beans underwent sensory evaluation. Protein content of raw beans generally varied inversely with irrigation. Rufus' beans contained significantly more thiamin than comparable `UI-114' beans. High-N non-diseased soils produced beans with methionine concn. greater than those from low N-Fusarium-infected soils. Pinto `UI-114' beans were rated significantly more acceptable than `Rufus' beans ($P < 0.001$). AS

Great Northern beans

Great Northern bean proteins

1411 Eicher (NJ) and Satterlee (LD). Nutritional quality of great Northern bean proteins processed at varying pH. Journal of Food Science 53(4); 1988; 1139-1143

Heating whole dry beans at pH well above or below their av. protein isoelectric point of 6.3, results in significant increase in protein digestibility, as measured by the rat NPR assay. Yet the nutritional quality of these pH-adjusted beans was lower than that for conventionally cooked dry beans due to the loss of cystein/cystine (Cys) from the beans during the long pH adjustment step as well as the increased sensitivity of Cys to heat at alkaline pHs. In contrast pH adjusted bean flour slurries, after rapidly drying (40 sec) on a double drum drier, yielded products having a high protein digestibility (> 80%), low trypsin inhibitor content (< 10mg TI/g protein) and showing little or no loss of Cys. AS

Mesquite pods

1412 Del Valle (FR), Marco (E), Becker (R) and Saunders (RM). Evaluation of an industrial process for producing protein enriched mesquite pod (Prosopis sp.) flour. Journal of Food Processing and Preservation 12(3); 1988; 179-185

Mesquite pods (Prosopis sp.) from two sp. of mesquite trees were industrially processed by toasting, grinding and screening to produce three fractions, (large, intermediate and fine). The fine (-100 mesh) flour was enriched in protein and reduced in fiber compared to the other fractions and the starting material. The process was shown to be capable of producing industrial quantities of flour from pods of both Prosopis sp. Of the processing conditions studied, toasting at 125 C for 40 min was found to result in a max. yield of fines and max. protein availability (measured by red flour beetle larva growth). The final product was a fine (-100 mesh) cream coloured low cost flour with many potential applications in the food industry. AS

Moth beans

1413 Pawar (VD) and Ingle (UM). Production of quick-cooking moth bean (Phaseolus aconitifolius Jacq). III. Effect of soaking on activity trypsin inhibitor. Indian Journal of Nutrition and Dietetics 24(12); 1987; 376-379

In this investigation the method for removing the undesirable attributes of moth bean (Phaseolus aconitifolius Jacq) like prolonged cooking time, phytates phenolic compounds, and enzyme inhibitors have been studied. Beans were soaked in mixed salt solution for 3, 6, 9 and 12 h dried and ground to pass through 60 mesh and trypsin inhibitor activity was determined. It is observed that soaking of moth beans in mixed salt solution proved advantageous in removing at least partially trypsin inhibitor activity. KAR

Navy beans

1414 Wang (C-CR) and Chang (SKC). Effect of selected canning methods on trypsin inhibitor activity, sterilization value, and firmness of canned navy beans. Journal of Agricultural and Food Chemistry 36(5); 1988; 1015-1018

The effects of selected canning methods on trypsin inhibitor activity and the relationships among sterilization, firmness, and trypsin inhibitor activity were investigated. Retort-cooking at 115.6 and 121.1 C for longer than 35 and 20 min, resp. did not increase trypsin inhibitor inactivation. The presence of Ca^{2+} /EDTA in the brine had a pronounced effect in increasing inactivation of trypsin inhibitor activity. Retort-cooking of navy beans in brine containing EDTA and calcium chloride at 115.6 C for 35 min or at 121.1 C for 15 min was optimal in terms of trypsin inhibitor inactivation, sterilization value, and firmness of the canned product. AS

Sesbania grandiflora

1415 Govindan (S) and Shanmugasundaram (ERB). Evaluation of the nutritive value of agathi (Sesbania grandiflora) leaf protein concentrate. Indian Journal of Nutrition and Dietetics 24(12); 1987; 370-375

The supplementary value of agathi leaf protein conc. (LPC) to wheat flour proteins and the effect of supplementation of agathi LPC with methionine on the nutritive value of the proteins have been determined in these studies. The digestibility coeff. (DC) of LPC was 85, the PER was 1.76 compared to 3.0 for casein. By supplementation of agathi LPC with methionine (0.5%) PER increased to 2.56. The biological value (BV) of LPC protein was 69 compared to 58 for wheat flour protein and 84 for casein. Supplementation of wheat flour proteins with agathi LPC at 5% level increased the BV to 75. KAR

OILSEEDS AND NUTS

Rapeseeds

Rapeseed proteins

1416 Tzeng (Y-M), Diosady (LL) and Rubin (LJ). Preparation of rapeseed protein isolates using ultrafiltration, precipitation and diafiltration. Canadian Institute of Food Science and Technology Journal 21(4); 1988; 419-424

Previously reported rapeseed protein isolation methods resulted in low yields or low protein purity. The isolates often had an unpleasant taste or dark colour, and the levels of glucosinolates, phytates or both in these products were a source of concern. A novel processing scheme was developed which included extraction with an aqueous sodium hexametaphosphate or sodium hydroxide solution, ultrafiltration, isoelectric precipitation at pH 3.5,a and diafiltration. An isoelectric protein fraction and a soluble protein fraction were produced. Up to 71.2% of the N was recovered in the isolates. The protein content of the isoelectric protein and soluble protein isolate was close to or higher than 90% (N x 6.25). A phytate content of less than 2% was achieved. These isolates were free of glucosinolates. AS

Soybeans

1417 Schumacher (H). New feasibilities for lowering of the energy consumption in extraction plants of soybean. FAT Science and Technology 90(11); 1988; 454-457 (De).

The fundamental news is a procedure for waste air recycling of the seed dryer for prewarming of the seed before flaking. The steam consumption for a complete soybean extraction plant (without hull separation) is less than 150 kg per ton of worked soybeans at simultaneous reduction of the total electricity consumption. The fundamental equipment parts for this energy reduction consists in a technically altered toaster dryer cooler system, expander and reuse of steam containing waste air of drying and cooling system. AS

Soy products

Soy milk

1418 Shelef (LA), Bahnmiller (KR), Zemel (MB) and Monte (LM). Fermentation of soymilk with commercial freeze-dried starter lactic cultures. Journal of Food Processing and Preservation 12(3); 1988; 187-195

Fresh soy milk was prepared with 9:1 and 7:1 water:dry soybeans ratio, and fermented with commercial freeze-dried starter cultures comprising three lactics. L. acidophilus S. thermophilus, and L. bulgaricus. pH and titratable acidity reached their lowest and highest values, resp., after 8 h of incubation at 43 C. Addition of sucrose did not influence pH or titratable acidity, and utilization of carbohydrate was 0.4%, (expressed as sucrose), irrespective of the initial sucrose level in the soy milk. Taste testing indicated that soy yoghurt (4% sucrose, 8 h of incubation), with a final pH of 4.5 and titratable acidity of less than or equal to 0.5%, expressed as lactic acid, was the most acceptable product. Its storage stability at 5 C exceeded 3 wks. AS

Soy proteins

1419 Hamada (JS) and Marshall (WE). Enhancement of peptidoglutaminase deamidation of soy protein by heat treatment and/or proteolysis. Journal of Food Science 53(4); 1988; 1132-1134, 1149

The limited deamidating ability of Bacillus circulans peptidoglutaminase towards soy protein was increased 27-fold by protein hydrolysis and altering soy protein conformation by moist heat. Adding disulphide bond reducing agents such as cysteine or sodium sulphite or salts such as NaCl or KCl to the reaction mixture had little or no effect on deamidation. However, heat treatment at 100 C for 15 min, both before and after Alcalase proteolysis, rendered soy protein very susceptible to amide hydrolysis by peptidoglutaminase. AS

1420 Volgarev (MN), Vysotsky (VG), Meshcheryakova (VA), Yatsyshina (TA) and Steinke (FH). Evaluation of isolated soy protein foods in weight reduction with obeses hypercholesterolemic and normocholesterolemic obeses individuals. Nutrition Reports International 39(1); 1989; 61-72

Seventeen obese hospitalized hypercholesterolemic patients and fourteen moderately over wt. outpatient volunteers participated in a one month wt. loss program using isolated soy protein fortified foods with 1,300 and 1,700 KCal diets. Mean wt. losses over the 30 and 28 day studies were 7.0 and 4.1 kg, resp. Physical and biochemical parameters were maintained in normal or unchanged status during the test period indicating that the high protein intakes (90 g) and balanced menus were able to keep the subjects in good nutritional status. Positive nitrogen balance was maintained during the 48 h collection during the first and final wk of the study. Blood cholesterol values were reduced by 41% in hypercholesterolemic patients and 16% in the outpatient volunteers. High protein isolated soy protein fortified foods offer a highly acceptable method for providing a balanced menu while reducing caloric intake for wt. control. AS

Sunflowers

Sunflower proteins

1421 Saeed (M) and Cheryan (M). Sunflower protein concentrates and isolates low in polyphenols and phytate. Journal of Food Science 53(4); 1988; 1127-1131, 1143

Protein conc. and isolates from sunflower (Helianthus annuus L.) essentially free of polyphenols and/or low in phytate, were prepared from dehulled seeds by a sequential extraction procedure using organic solvents, such as hexane for defatting and acidic butanol for removing polyphenols. Phytate was removed by aqueous extraction and separation at acidic and/or alkaline conditions, depending on the relative solubility of the protein and phytate. Reduced-phytate conc and isolates developed off-colours unless the polyphenol concn. was less than 0.05%. The protein solubility profile of the reduced-phytate products was much better than that of the defatted meal, especially below the isoelectric point. AS

TUBERS AND VEGETABLES

Root vegetables

Onions

1422 Younis (SA), Al-Hakkak (ZS), Al-Rawi (FI) and Hagop (EG). Physiological and cytogenetic effects of phosphine gas in Allium cepa (L). Journal of Stored Products Research 25(1); 1989; 25-30

Seeds of red onion at 6% and 15% moisture contents (MC) were fumigated (at 25 plus or minus 2 C) with phosphine at two doses - 7 mg/l and 14 mg/l in 100 ml bottles for 2 and 4 wks. At 6% MC phosphine did not affect germination and seedling growth but a significant reduction in these parameters was observed when seeds were at the higher moisture content. Phosphine appeared to significantly increase the rate of mitotic inhibition and chromosome aberrations. The latter effect was more pronounced in seeds of higher moisture content. The protein content of these seeds was not affected by phosphine treatment. The present study shows that phosphine has a definite mutagenic activity and provides good support to the previous findings on phosphine-induced mutations in insects. SGB

Tubers

Potatoes

1423 Munshi (CB) and Mondy (NI). Effect of soil applications of sodium molybdate on the quality of potatoes. Polyphenol oxidase activity, enzymatic discolouration, phenols, and ascorbic acid. Journal of Agricultural and Food Chemistry 36(5); 1988; 919-922

The effect of soil applications of molybdenum on polyphenol oxidase activity, enzymatic discolouration, and total phenolic, chlorogenic acid, tyrosine, and ascorbic acid contents of Katahdin potatoes was investigated. Sodium molybdate was applied at rates of 0.0, 2.8, 6.7 and 10.1 kg/ha. Ascorbic acid increased significantly ($P < 0.01$) with increasing levels of molybdenum fertilization. No significant changes in polyphenol oxidase activity, enzymatic discolouration, or total phenolic chlorogenic acid, and tyrosine contents were observed at 2.8, and 6.6 kg/ha applications of sodium molybdate. However, there was highly significant ($P < 0.01$) decrease in polyphenol oxidase activity, enzymatic discolouration, and total phenolic, chlorogenic acid, and tyrosine contents in tubers from plants receiving 10.1 kg/ha of sodium molybdate. AS

1424 Park (K-H), Kim (Y-M) and Lee (C-W). Thermal inactivation kinetics of potato tuber lipoxygenase. Journal of Agricultural and Food Chemistry 36(5); 1988; 1012-1015

The thermal inactivation kinetics of two isozymes, crude and reconstituted enzyme preparations of potato tuber lipoxygenase, was investigated in solution. Kinetic parameters of thermal inactivation were determined graphically and by a least-squares method using nonlinear regression analysis. Each of the two isozymes followed first-order kinetics with different inactivation rate constants. However, the apparent inactivation kinetics of crude and reconstituted lipoxygenases exhibited second-order kinetics, and this could be explained by the presence of two isozymes having different heat resistance. Heat inactivation data (percent residual activity) of crude and reconstituted lipoxygenase could also be adequately calculated from the two isozymes, first-order inactivation rate constants and their enzyme reaction rate constants. The results suggested the possible utilization of parameters derived from the apparent second-order kinetics for predicting the extent of thermal inactivation of isozymic mixture of potato tuber lipoxygenase. AS

1425 Zitnak (A) and Filadelti-Keszi (MA). Isolation of BetaMchaconine, a potato bitterness factor. Journal of Food Biochemistry 12(3); 1988; 813-189

A simple procedrue for the isolation of the Beta-chaconine diglycoside from mixtures with Alpha-solanine obtained via endogenous enzyme action in potato berry and blossom homogenates. The 4-rhamnoglucoside of alkaloid Beta $_2$ -chaconine by fractionation from hot ethylacetate. The mixture of the two glycoalkaloids is obtained by endogenous enzyme action in a homogenate of potato berries and blossoms within a 24-36 h incubation at 37 C, pH 6.00. The identity of Beta $_2$ -chaconine was ascertained by m.p., (Alpha)^{20} D, IR spectrum, TLC of sugar components and reference to partial acid hydrolysis products of Alpha-chaconine. NGKR

Potato starch

1426 Dluzewski (M), Lada (E), Latkowska (J), Waczkowski (W) and Zdanowciz (D). Effect of selected methods of modifying of potato, wheat and maize starches on their physico-chemical properties. Acta Alimentaria Polonica 13(1); 1987; 15-22

Starches of 53 Polish triticale breeding lines were investigated. Gelatinization characteristics and limiting viscosity of starch were determined. The studied properties of triticale starch are similar to those of wheat starch, although viscosities of triticale starch pastes were in the majority of samples higher than in the "Grana" wheat standard. In the total population tested, a few starches show a considerably low viscosity of starch pastes which may be a result of enzymatic degradation. AS

Sweet potatoes

1427 Chang Rupp (PL) and Schwartz (SJ). Characterization of the action of Bacillus subtilis alpha -amylase on sweet potato starch, amylose and amylopectin. Journal of Food Biochemistry 12(3); 1988; 191-203

Using high performance size exclusion chromatography (HPSEC) the action pattern of Bacillus subtilis alpha-amylose on `Jewel' var. sweet potato starch, amylose and amylopectin was monitored. It was seen that a wide range of products, from high mol. wt. polysaccharides to specific saccharides of low mol. wt., were observed. The hydrolysis pattern for amylose in starch was concealed by hydrolytic fragments formed from amylolysis of the greater quantity of amylopectin. The results showed that the action of Alpha-amylase on sweet potato starch is generally not a random process, primarily resulting from enzymatic action on amylopectin. A more random type of hydrolysis was also observed from acid treated starch. NGKR

1428 Chang-Rupp (PL) and Schwartz (SJ). Comparison of oligo- and polysaccharides formed from starch during processing of sweet potato puree by endogenous and exogenous enzyme treatments. Journal of Food Science 53(4); 1988; 1144-1149

Hydrolysis patterns of starch were monitored during production of sweet potato puree (Jewel var.) using high performance size exclusion chromatography. A wide range of polysaccharides from large mol. size to simple sugars was observed. Lye peeling, prior to pureeing, induced partial hydrolysis by native enzymes due to gelatinization of starch from heat and alkali. Native enzymes were inactivated by steam injection (105 C for 5 min) and the puree treated with Bacillus subtilis alpha-amylase and Tenase, a thermostable alpha-amylase. Bacillus subtilis alpha-amylase produced a narrower mol. size range of polysaccharides during hydrolysis relative to Tenase. The av. mol. size distribution of amylolysis end products from the native and exogenously treated systems differed. Specific lower mol. wt. oligosaccharides formed during the final stages of amylolysis. AS

Vegetables

1429 Gentschev (L) and Kijamov (KS). Extraction procedure of vegetable raw materials. Flussiges Obst 55(12); 1988; 686-694 (De).

Leaf vegetables

Alfalfa

1430 Massiot (G), Lavaud (C), Guillaume (D) and Men-Oliver (LL). Reinvestigation of the sapogenins and prosapogenins from alfalfa (Medicago sativa). Journal of Agricultural and Food Chemistry 36(5); 1988; 902-909

The structures of the hydrolysis products of the alfalfa saponins have been investigated as preliminary studies of the native saponins. Identified known products are the soyasapogenols A, B, C, and E, hederagenin, and medicagenic acid. Bayogenin and zanhic acid known from other sources have now been characterized in alfalfa. The elusive lucernic acid is presumed to be a lactone artefact derived from zanhic acid, i.e. 16-hydroxymedicagenic acid. Five prosapogenins containing medicagenic acid and zanhic acid (plus glucose, glucuronic acid, or sophorose) have been identified in the saponins hydrolysates;

their structures have been established without degradations and mainly rest on NMR and MS measurements. An HPLC method is proposed for the detn. of medicagenic acid content in alfalfa. AS

Pumpkins

1431 Teotia (MS), Kaur (S) and Berry (SK). Effect of moisture conditioning on dehulling efficiency of pumpkin seeds. Indian Food Packer 42(6); 1988; 26-29

Pumpkin (Cucurbita moschata) seeds rich in oil and protein and used in snack preparation were conditioned to 20-60% moisture and passed through the hulling system and the hulling efficiency and breakage were assessed. Max. yield (74-78%) was obtained at moisture content of 50-60%, where the breakage of kernels was 26-22%. It is advisable to separate the unhulled seeds for recycling to achieve max. dehulling efficiency and whole kernel yield. KAR

Squash

1432 Khachick (F), Beecher (GR) and Lusby (WR). Separation and identification of carotenoids and carotenol fatty acid esters in some squash products by liquid chromatography. 2. Isolation and characterization of carotenoids and related esters. Journal of Agricultural and Food Chemistry 36(5); 1988; 938-946

The predominant carotenoids and carotenol fatty acid esters in extracts from several var. of squash have been isolated by preparatives thin-layer chromatography (TLC) employing C-18 reversed - phase and normal-phase silica gel plates. As many as 25 components were separated and characterized in most cases on the basis of their absorption and mass spectral properties. Four classes of compounds were shown to be present: xanthophylls, hydrocarbon carotenoids, and carotenol mono- and bis (fatty acid esters). Structural elucidation of several carotenol mono-(fatty acid esters) was based on the data obtained from nuclear magnetic resonance (NMR) spectroscopy of these compounds as well as NMR data obtained from several synthetic model compounds. Several stereoisomers of carotenoids and carotenol fatty acids esters were shown to be present in the extract from a var. of a raw and cooked acorn squash. In some cases semipreparative high-performance liquid chromatography was employed to separate the cis isomer of carotenoids. A number of straight-chain bis-(fatty acid esters) of lutein and violaxanthin, which were shown to be the major carotenoid constituents of several squash products, were prepared by partial synthesis. AS

1433 Khachik (F) and Beecher (GR). Separation and identification of carotenoids and carotenol fatty acid esters in some squash products by liquid chromatography. I. Quantification of carotenoids and related esters by HPLC. Journal of Agricultural and Food Chemistry 36(5); 1988; 929-937

The prodominant carotenoids and carotenol fatty acid esters in extracts from three var. of squash have been separated on a C-18 reversed-phase column, employing a combination of isocratic and gradient elution high-performance liquid chromatography (HPLC). The general chromatographic profiles of the extracts from these squash products showed marked differences in both qualitative and quantitative distribution of carotenoids and carotenol fatty acids esters. Four classes of compounds have been shown to be present. In the order of chromatographic elution, these were oxygenated carotenoids (xanthophylls), carotenol mono(fatty acid esters), hydrocarbon carotenoids, and carotenol bis (fatty acid esters). The xanthophylls were identified as violaxanthin and lutein as well as several of their cis stereoisomers. The mono(fatty acid esters) were identified as lutein monomyristate, lutein monopalmitate, and violaxanthin monomyristate. The hydrocarbon carotenoids were identified as all-trans-Alpha-carotene, all-trans-Beta-carotene, and its 15,15' cis-isomer. The saturated straight-chain bis (fatty acid esters) of violaxanthin, violeoxanthin (9-cis-violaxanthin), and lutein were shown to be present in the extracts from these squash products. AS

Tomatoes

1434 Carpi (G), Porretta (S) and Dall'Aglio (G). Utilization of dried tomatoes and aubergines for the production of preserves in oil. Industria Conserve 63(2); 1988; 114-116 (It).

Halved tomatoes and aubergines cut into 8 sections, which had been dehydrated under optimal conditions in sucked air pilot drier, were reconstituted by a technique which alternated humidification with nebulized water (tomatoes) or wine vinegar (aubergines) and vapour treatment and which allowed reconstitution to different moisture levels. Tomatoes and aubergines reconstituted to 48% and 51% moisture content resp. were packed in glass in olive oil and pasteurized. AS

1435 Cheng (T-S) and Shewfelt (RL). Effect of chilling exposure of tomatoes during subsequent ripening. Journal of Food Science 53(4); 1988; 1160-1162

Mature green tomatoes were stored at 4 C, greater than or equal to 90% RH, for up to 39 days and transferred to 21 C, greater than or equal to 90% RH, for further ripening. After 15 days of chilling exposure, stimulation of ethylene production and increased susceptibility to decay were observed when the fruit was ripened at ambient temp. As chilling exposure increased ethylene production upon removal to 21 C returned to the level of the control. Irreversible inhibition of colour development was observed in fruit exposed to 4 C for 34 days and an increase in carbon dioxide production was noted upon warming of tomatoes chilled for 39 days. AS

1436 Dobrzycki (J), Barylko-Pikielna (N) and Michalska (A). Instrumental method of firmness measurements tomatoes to be harvested mechanically. Acta Alimentaria Polonica 13(2); 1987; 123-132

A review of the existing methods of tomatoe firmness measurement provided a basis for evaluating the usefulness of three groups of methods: punching testing (different sizes and shapes), compression

(compression force and deformation) and skin tension test (tension force and elongation). It was found that final compression force was the simplest and most useful index of tomato firmness, especially of tomatoes intended for mechanical harvesting. AS

1437 Satwadhar (PN), Kulkarni (DN) and Ingle (UM). Studies on tomato cultivars: I. Physico-morphological, biochemical and physiological variation. Indian Food Packer 42(6); 1988; 30-37

Commonly cultivated cv. of tomatoes (`Pusa Ruby', `Hy-10', `Karnataka Hybrid', `Bony Best', `Punjab Chhuhara', `S-474-4-1', `S-580-1-1', `S-14', `S-1', `S-3', `S-19' and `S-556-1-1') were studied for physico-morphological characters (wt. diameters, polar length, glossyness, red/yellow ratio, no. of seeds extractable juice and pomace: pulp ratio), physiological loss in wt., soluble solids content, acidity, etc. `Karnatka Hybrid' weighed max. (310 g) followed by `Hy-10' (125 g). Density was high in S-580-1-1 (1.092) and low in `S-474-4-1' (0.972). The number of seeds/fruit was high in `Pusa Ruby' (288) followed by `S-580-1-1' (186). Colour measured as Red to yellow ratio was found to be higher in `S-556-1-1' and low in `Karnatka Hybrid'. The fruits stored at about 30 C are marketable upto 8 days (mature green stored), 20 days (pink stored) and 4 days (ripe stored) and the corresponding storage days at 18 C storage were 20, 20 and 8 days. Total extractable juice % was found to be high in `S-14' (90.36%) and in `Hy-10' (88.54%). `Push Ruby' contained highest solids and Bony Best highest acidity. Tomatoes of firm ripe, pink and mature green stages were packed in polythene bags with 32 vents of 0.6 cm dia. They could be stored with markatable quality at ambient temp. (30 C) and 18 C upto 4, 16, 24 and 1 g 24, 30 days resp. Physiological loss in wt. is more in all three stages of maturity when stored at ambient temp. than at 18 C. KAR

FRUITS

1438 Diaz Borras (MA) and Vila Aguilar (R). A comparative study of the efficacy of different fungicides in the disinfection of fruits and vegetables storerooms. Revista de Agroquimica y Tecnologia de Alimentos 27(4); 1987; 539-544 (Es).

A comparative study on the efficacy of four fungicides (Imazalil, FC-1, Total Shock and Tectab) in the desinfection of fruits and vegetables storerooms was carried out. Suspensions of mixtures of spores of Penicillium, Cladosporium, Rhizopus, Alternaria, Geotrichum and Botrytis genera were dispersed in = 12 ^{3} storerooms, and the fungicides assayed were applied. Air-borne and superficial contamination were evaluated both before and after treatments, and reduction percentages calculated for each fungicide. FC--1 showed the best and most homogeneous behaviour against different moulds genera. Imazalil and Total Shock showed also satisfactory results. AS

1439 Mastrocola (D), Severini (C), Pestalozza (A) and Lerici (CR). High-temperature osmosis and forced-draft dehydration of fruits and vegetables. Industria Conserve 63(2); 1988; 109-113 (It).

After treatment by high-temp. short-time osmosis (HTST-osmosis: 80 C for 3 min) with syrups of 70 Brix as osmotic agents, diced apples and carrots were subjected to forced-draft drying at air temp. of 100 C for the first 20 min and then of 80 C to complete dehydration. For comparison purpose, diced apples and carrots were also directly dried under the same conditions as those used for the pre-osmosed samples. Results show that the osmotic preliminary treatment improves the sensory characteristics (texture, flavour and colour) of the dried product without lengthening drying time; it may even allow remarkable time savings in the case of intermediate moisture food products. AS

1440 Roy (P) and Mazumdar (BC). Pectin content in some minor fruits and fruit parts. Science and Culture 55(3); 1989; 110-111

Pectin content in the pulp or husk of fully mature nine fruits was determined. Of these fruits, pectin content (fresh wt. basis) was 4% in carambola (Averrhoa carambola), 3.50% in shaddock (Citrus grandis), 3.80% in jamir lemon (Citrus jambhiri), 3.11% lemon (Citrus limon), and 2.66% in wood apple (Aegle marmelos). In other fruits pectin content was low. KAR

Apples

1441 Qice (C-G Rao (MA). Role of pulp content and particle size in yield stress of apple sauce. Journal of Food Science 53(4); 1988; 1165-1170

A paddle mixer in conjunction with a rotational viscometer was used to determine the yield stress and the shear rate-shear stress data of apple sauce . Magnitudes of yield stress obtained by extrapolation of the shear rate-shear stress data according to Casson, Herschel-Bulkley, and Mizrahi-Berk models were considerably lower than the experimental values. The experimental values were closer to the Bingham yield values obtained by extrapolation of the straight line portion of the shear rate-shear stress data. Pulp content and average particle size of the solids affected the magnitudes of the yield stress. AS

1442 Sharma (DD), D'Souza (VF), McConnell (MB) and Mazza (G). Identification and quantification of sugars in winter-hardy apples by high performance liquid chromatography. Canadian Institute of Food Science and Technology Journal 21(4); 1988; 435-437

The sugars present in 10 Prairie-adapted apple cvs were identified and quantified by high performance liquid chromatography (HPLC). Total sugar content ranged from 5.8% for Heyer --12 to 9.7% for Breakey apples. Except Collect (7.9%), Heyer --12 (5.8%) and September Ruby (8.5%), all cvs had intermediate sugar content. The predominant sugar was fructose, followed by glucose and sucrose. Frutose (4.4-6.9%) and glucose (1.4-3.4%) concn. in the winter-hardy apple cvs were comparable to values reported in the literature for apples grown in milder climates. Compared to the reported range of 1.3-6.6%, sucrose concn. in the prairie-adopted apple cvs was low (0.0-1.1%). The most frequently occurring minor sugar was xylose. It was quantified in all cvs except Heyer --12. Galactose and arabinose were present in trace amounts in two of the ten cvs except Heyer --12. Galactose and arabinose were present in trace amounts in two of the ten cvs studied. AS

Bananas

1443 Garcia (E) and Lajolo (FM). Starch transformation during banana ripening. The amylase and glucosidase behaviour. Journal of Food Science 53(4); 1988; 1181-1186

Banana starch disappearance during ripening originated at the central portion of the fruit radiating, afterwards, to the surface; the amylose/amylopectin ratio remained constant during the process. The amyloplast was investigated by light and scanning electron microscopy. The surface of starch granules was smooth, and the unique modification observed during ripening was the reduction of the granule dimensions; at advanced ripening stages, some striations were detected on the surface of both small and large granules. Several amylolytic enzymes were followed during banana ripening. Seven amylases were detected at all stages, presumably three Alpha-and four Beta-amylases and, like glucosidases, their activity increased at the climacteric phase; only Beta-amylase activity increased before the onset of the respiratory peak. For the first time Alpha-1, 6-glucosidase activity was detected in banana. AS

Cherimoya

1444 Martinez-Cayuela (M), De Medina (LS), Faus (MJ) and Gil (A). Cherimoya (Annona cherimola Mill) polyphenoloxidase. Monophenolase and dihydroxyphenolase activities. Journal of Food Science 53(4); 1988; 1191-1194

Polyphenoloxidase (PPO) from cherimoya epicarp catalyzed the hydroxylation of monphenols like L(-)tyrosine, tyramine, and p-cresol (monophenolase activity), and oxidation of o-dihydroxyphenols like catechol and I-DOPA (dihydroxyphenolase activity). The hydroxylation of monophenols occurred after a lag period which was shortened by diphenols. The Km values indicated a low affinity of PPO to the substrates. Aliphatic mono-and dicarboxylic acids and sugars did not show any inhibitory effect on PPO cherimoya epicarp. Cysteine and mercaptoethanol, but not ascorbic acid, appeared to be protective agents of PPO cherimoya epicarp. AS

Custard apples

1445 Brown (BI), Wong (LS), George (AP) and Nissen (RJ). Comparative studies on the postharvest physiology of fruit from different species of Annona (Custard apple). Journal of Horticultural Science 63(3); 1988; 521-528

In order to bring out the fruit of excellent eating quality 3 var. of Annona fruit were treated with ethylene and propylene gases in optimul concn. so as to achieve uniform ripening. Application of propylene gas was stopped as soon as the initiation of ripening started since the gas induced deletrious effects on the skin. The methods of application and the gas concn. were described. BAP

Grapes

1446 Moresi (M), Monteleone (E) and Trunfio (A). Economic feasibility of microbial biomass production from acid hydrolysate of grape marc. Industrie Alimentari 27(261); 1988; 525-530, 534 (It).

In this work the flow diagram of a novel process for an integral utilization of wine processing wastes was outlined. It involves the following: a) recovery of seeds and calcium tartrate from grape marc; b) production of microbial biomass from the sugars recovered by a low-acid concn. (1% w/v) and medium temp. (170 C) hydrolysis of grape marc, c) utilization of grape stems and the ligno-cellulosic residue resulting from acid hydrolysis as fuel. With reference to the waste load of a typical winery of South Italy (ca. 300 metric tons of grape marc per day over a working period of 60 days per year) the process under study would present a rate of return on the investment of 15% with a pay-out period of 5.5 yrs. provided that no financial subsidy is granted, thus allowing wine processing wastes to be disposed of at no extra-charges for the winery considered. AS

Kiwifruits

1447 Cossa (G), Trova (C) and Gandolfo (G). Extraction and identification of kiwifruit volatile constituents. Industrie Alimentari 27(261); 1988; 531-534 (It).

The extraction of volatile constituents of kiwifruit was performed stripping them from blended pulp by means of a N stream; the carried substances were fixed on an adsorption tube filled with activated charcoal (NIOSH tube), eluted with carbon disulphide and then analyzed using a GC-MS system. Several volatile compounds (27) were identified; some of them (2,2 Diethyl-1 Pentanol. for instance) were not reported in foregoing works about this topic. The most important aromatic compounds found in Italian fruits were the same as the ones reported for kiwifruit coming from New Zealand and USA. AS

Mangoes

1448 Gupta (TR) and Girish (K). Stdies on mango pulp filtration for concentrat on by pectinolytic enzyme treatment. Indian Food Packer 42(6); 1988; 7-14

Effect of pectic enzyme concn. and incubation time of lowering the viscosity of 'Totapuri' mango pulp for further concn. has been studied. Commercial pectinolytic enzyme which was prepared by growing strain of Aspergillus carbonarius on wheat bran has been used. Temp. of the pulp was maintained at 50 C. The rheological behaviour of pulp was non-Newtonian in the beginning but after enzyme treatment it has shown Newtonian characteristics. Enzyme concn. of 1-2.5% and incubation periods of 1-3 h and 17 h (overnight were tried in this experiment). Enzyme concn. of 2% for 2 h at 50 c resulted in 77% decrease in apparent viscosity and serum yield of 65% was achieved by lab. vacuum filter. However, by keeping treated pulp overnight (17 h) gave serum yield of 68% with 1.5% enzyme at room temp. (30 C). Untreated control pulp gave serum yield of 40% at 50 C by a centrifugation at 13000 x g. Plate and filter press is well suited for filter than the vacuum filter or tubular centrifuge. The separated serum with 15% total soluble solids could be concentrated to 5-fold to get a serum conc. of 75% total soluble solids content. The canned conc. retained natural colour and flavour during 6 months storage at 30 C. KAR

Mango pulp

1449 Thakur (BR) and Arya (SS). Relative suitability of plastic films for the frozen storage of mango pulp. Journal of Food Processing and Preservation 12(3); 1988; 171-178

Thermally blanched and unblanched mango pulp of three commercial var. were packed in polyethylene, polypropylene and paper-Al foil-polyethylene laminate pouches, frozen and stored at -12 C for 12 months. Blanched samples were found to be more stable than the corresponding unblanched samples and samples stored in foil laminate pouches were rated superior to all other samples. Retention of total carotenoids in blanched samples ranged between 79.7-95.1% in foil laminate, 56.7-82.5% in polypropylene and 50.9-71.9% in polyethylene pouches while ascorbic acid retention was 56.8-88.4%, 13.4-36.0% and 11.0-19.7%, resp. in laminate, polypropylene and polyethylene pouches after 12 months storage. Total sugar and acidity did not change appreciably during frozen storage of mango pulp. AS

Nectarines

1450 Engel (K-H), Ramming (DW), Flath (RA) and Teranishi (R). Investigation of volatile constituents in nectarines. 2. Changes in aroma composition during nectarine maturation. Journal of Agricultural and Food Chemistry 36(5); 1988; 1003-1006

Changes in the distribution of volatile constituents during the maturation of nectarines (Prunus persica L., Batsch var. nucipersica Schneid) were investigated by means of capillary gas chromatography. C_6 aldehydes and alcohols are the major components isolated from "green" fruit; in the course of fruits maturation, the concn. of these C_6 components decrease and lactones become prominent constituents. Gamma-and Delta-lactones develop differently depending upon their chain lengths. The last period of nectarine maturation, from "shipping-ripe" to "tree-ripe" fruit, is characterized by a significant increase in the amounts of aroma-contributing lactones having longer aliphatic side chains. AS

Oranges

1451 Wicker (L), Vassallo (MR) and Echeverria (EJ). Solubilization of cell wall bound, thermostable pectinesterase from Valencia orange. Journal of Food Science 53(4); 1988; 1171-1174, 1180

Complete solubilization of citrus pectinesterase is not effected by alkaline salt buffers but is partially enhanced after degradation of the cell wall by pectinase and cellulase. After heating at 70 C for 2 min, the pectinesterase fractions solubilized after enzymatic cell wall degradation possessed three times the residual activity of the pectinesterase fractions solubilized by alkaline salt buffer, isoelectric focusing prints of pectinesterase activity and SDS polyacrylamide gel electrophoresis suggest increased solubilization of a heat stable pectinesterase isozyme after cell wall degradation. AS

Peaches

1452 Levi (A), Ben-Shalom (N), Plat (D) and Reid (DS). Effect of blanching and drying on pectin constituents and related characteristics of dehydrated peaches. Journal of Food Science 53(4); 1988; 1187-1190, 1203

The effects of sulphuring, blanching, dehydration, and storage (of dehydrated fruits), on the pectic constituents and other characteristics of peaches are reported. Adequate blanching stabilized pectins of the dehydrated peaches so higher rehydration capacity and lower rehydration losses were observed after 5 min blanching. Increase in degradation was observed in nonblanched or 15 min heat-treated fruits, which resulted in lower rehydration capacity. A significant correlation was found between the contents of total pectin and protopectin fractions and the firmness or rehydration ratio of the peaches. Thus, pectin, one of the major cell-wall and intercellular tissue components, plays a significant role in determining the textural-structural characteristics of dehydrated fruits. AS

Pears

1453 Tuszynski (T). Chemical and sensory assessment of fermented pear distillates. Acta Alimentaria Polonica 13(1); 1987; 57-66

The physico-chemical and sensory characteristics of distillates of fermented mashes from "Bera Williams" pears were investigated. It was found that the distillates with untypical sensory characteristics contain a particularly high amount of hexyl alcohol, fusel alcohols and that they have a less varied qualitative and quantitative composition of esters and fatty acids. AS

CONFECTIONERY, STARCH AND SUGAR

Confectionery

Chocolates

1454 Biquet (B) and Labuza (TP). Evaluation of the moisture permeability characteristics of chocolate films as an edible moisture barrier. Journal of Food Science 53(4); 1988; 989-998

The moisture barrier properties of a semisweet dark chocolate film, including effective diffusion coeff. and effective permeability constants, were determined at variable film thickness, temp. and relative humidity in the intermediate moisture range. In addition, both adsorption and desorption isotherms were determined. It was found that this chocolate film 0.6 mm (24 mil) thick was a better moisture barrier than a 1 mil thick low density polyethylene film. The mathematical packaging model for nonedible packaging materials worked well for a typical outer barrier coated model system while a new mathematical model predicted well the moisture transfer within a bicomponent system of different initial water activity with the barrier between them. AS

1455 Tscheuschner (HD) and Markov (E). Examination of the texture of chocolate. Part IV. Lebensmittelindustrie 35(6); 1988; 260-262 (De).

Cocoa

Cocoa butter

1456 Arnoldi (A), Arnoldi (G), Baldi (O) and Griffini (A). Flavour components in the Maillard reaction of different amino acids with fructose in cocoa butter-water. Qualitative and quantitative analysis of pyrazines. Journal of Agricultural and Food Chemistry 36(5); 1988; 988-992

Eight amino acids were reacted with fructose in deodourized cocoa butter-water as a model of the Maillard reaction in cocoa beans. Detailed GC/MS analysis of the volatile compounds obtained is reported with particular reference to similarities and differences in the patterns obtained with the amino acids. A quantitative analysis of pyrazines is described. Among the 22 pyrazines detected, 15 had been already reported in roasted cocoa beans. 2-(3-Methylbutyl)-3, 6-dimethylpyrazine was formed in the reaction of leucine, while lysine gave three 2-methoxy-3-alkylpyrazines not reported in cocoa. AS

Starch

1457 Emilia Abraham (T), Krishnaswamy (C) and Ramakrishna (SV). Hydrolytic depolymerization of starch raw materials. Starch/Starke 40(10); 1988; 387-392

The common commercially available starchy sources in India namely cereals like wheat, corn, rice, sorghum were taken for the studies and compared with cassava. Starches from various sources need different type of liquefaction and saccharification procedures. The relative depolymerization procedures with viscosity and oligosaccharide profiles are reported. Rice flour gives very good conversion percentages, but the liquefactions step should be more drastic than other starchy raw materials. Wheat flour, maize flour, and maize starch could be hydrolysed by both acid-enzyme and enzyme-enzyme methods to give good conversion rates. Sorghum starch was found to be most difficult to hydrolyse and gave only 84% conversion. AS

1458 Rapaille (A). Application of hydrogenated products. Starch/Starke 40(9); 1988; 356-359

Sorbitol and maltitol, produced by catalytic hydrogenation of dextrose and high maltose-containing glucose syrups, resp. are very suitable sweeteners for production of sugarless food products. Sorbitol is also successfully used in the pharmaceutical and cosmetic industries as well as in a range of non-food applications. Following a review of the properties of both polyols, the most important food applications are discussed. The use of sorbital is described in confectionery products, chocolate, and particularly in tabletting, which is important for the pharmaceutical industry. Sorbital powders of different particle size distributions can be used. Their powders properties are related to flow and compression characteristics, as well as to tablet properties size distributions can be used. Their powder properties are related to flow and compression characteristics, as well as to table properties such as hardness, friability, desintegration time and storage stability. Specific technological properties of sorbital in classical confectionery compositions are also briefly discussed. For maltitol syrups the application work is focussed on sugarless confectionery products, more specifically hard candies and gums. Details are provided on formulations, manufacturing conditions and on properties of the final sweets, particularly taste, texture and storage stability. AS

1459 Richardson (SJ). Molecular mobilities of instant starch gels determined by oxygen-17 and carbon-13 nuclear magnetic resonance. Journal of Food Science 53(4); 1988; 1175-1180

The mol. mobility of both the water component and the starch component of three instant starches was determined by proton decoupled oxygen-17 and proton decoupled carbon-13 nuclear magnetic resonance (NMR) spectroscopy. The effect of starch concn. and various storage conditions were studied. The mol. mobility of water associated with each of the instant starches over all concn. studied as measured by oxygen-17 NMR transverse relaxation rates was not much slower than that of free or bulk water. The effect of storage conditions on the mol. mobility and conformation of the starches, as monitored by proton decoupled oxygen-17 and carbon-13 NMR, was in most cases small, despite the observed differences in retrogradation among the starches. AS

Sugar

1460 Jain (NC) and Bajpai (A). Utilisation of sulphitation filter mud-present and future prospects. Indian Sugar 39(1); 1989; 15-24

Literature on the utilization of sulphitation filter mud from 1965 to 1987 has been synchronised and presented. Data collected from Indian sugar factories have also been included. Use of filter-mud for compost, biogas production, animal feed and for wax extraction have been indicated. KAR

1461 Lande (DS) and Londhe (MB). Need for pan automation. Indian Sugar 39(2); 1989; 75-89

The author briefly points out the benefits accured by automation of cane carrier drive, juice clarification and centrifugals. The advantages of automation in pan boiling have been listed, which include higher crystal content, higher exhaustion, reduction in boiling time, reduction in total massecuite % cane and reduction in steam consumption. KAR

1462 Sangiorgi (E). Survey on isoglucose adulteration of honey. Industrie Alimentari 27(260); 1988; 442-444 (It).

A survey has been made on isoglucose adulteration of honey. The purification method and the TLC have been modified to make them more suitable for routine analysis. AS

1463 Singh (N), Singh (SJ), Bawa (AS) and Sekhon (KS). Honey-its food uses. Indian Food Packer 42(6); 1988; 15-25

The review article deals with aspects like productions, composition, antibacterial properties, processing, storage methods of honey and its utilisation in foods, in bakery, fruits and vegetable products, fermented products, and milk and milk products. 58 references. KAR

Gur

1464 Dubey (V) and Lal (U). Gur grading in Uttar Pradesh. Indian Sugar 39(2); 1989; 101-106

Gur samples were collected from five zones of Uttar Pradesh (India) and analysed for colour, texture, taste, hardness, flavour, sucrose, reducing sugars, moisture, insoluble residues and ash contents to fix up grades. On the basis of these norms and scoring gur was graded into (i) extra special, (ii) special (iii) \`A' grade, (iv) \`B' grade, (v) \`C' grade and (vi) \`D' grade. The values for physical and chemical characteristics for the above grades have been fixed which is based on scoring. It was also found that except \`D' grade all others are edible. Gur of extra special and special grades are better for storage. \`A' and \`B' grade gur should not be stored for long and also during monsoon, and C and D grade gur are not fit for storage. KAR

BAKERY PRODUCTS

1465 Osnabrugge (WV). How to flavour baked goods and snacks effectively. Food Technology 43(1); 1989; 74-82

Flavour chemicals can interact with carbohydrates, proteins, and fats, yielding unbalanced flavour in the food products. Some novel systems are available to the food product developer to overcome these problems. This article review some of the problems involved in flavouring baked foods and snacks and suggest some possibilities, where a different approach in flavouring the food product can contribute to its success with the consumer. Chemical interaction of flavour with carbohydrate, proteins and fats has been delt with examples. GAR

Biscuits

Crackers

1466 Rogers (DE) and Hoseney (RC). Effects of fermentation in saltine cracker production. Cereal Chemistry 66(1); 1989; 6-10

Yeast was found to be necessary in cracker sponges. Stack wt. decreased with increased yeast fermentation because of the decreased dough density. In addition, the cracker cell structure was finer and more uniform. The starter slurry inoculated the system with bacteria and was required to decrease the pH. The lower pH allowed the flour proteases to modify the flour proteins. Stack height decreased when slurry was included in the cracker formula, but the textural strength of the cracker increased. During the 18-h sponge fermentation, gas was produced, the pH declined, and the flour proteins were enzymatically modified. With the total starter system, cracker stack height and stack wt. decreased as sponge fermentation time increased. At the same time, the texture, of the crackers changed from extremely tender and fragile to strong with increasing sponge fermentation time. The 4-h rest period following dough-up was essentially a proof period and allowed equilibration of moisture. AS

1467 Rogers (DE) and Hoseney (RC). A fractionation and reconstitution method for saltine cracker flours. Cereal Chemistry 66(1); 1989; 3-6

Five cracker flours and one hard wheat flour were baked into crackers after fractionation and reconstitution techniques. The procedure involved the centrifugation of cracker flour slurry in water and remixing of the centrifugate before handwashing. The lyophilized fractions were dry-blended, rewetted, air dried and ground to obtain reconstituted flour. Four among these flours had baking qualities comparable to those of parent flours and the poor quality of one of the samples was greatly improved by this technique. This suggest that disaggregation of flour particles during the fractionation procedure was benificial to cracker production. AR

Bread

1468 Baruch (DW) and Atkins (TD). The Wheat Research Institute Chomper an instrument that measures crumb flexibility. Cereal Chemistry 66(1); 1989; 56-66

A bread-shearing machine, the Wheat Research Institute Chomper, records a unique dynamic stress-strain curve, the chompergram. The initial slope of the chompergram enables the detn. of crumb flexibility of bread, which is correlated to firmness. Peak height of the chompergram measures the failure of the crumb in tension. This paper covers the theory of the Chomper and the procedure for measuring the above two parameters. A novel method of determining Poisson's ratio is also advanced. AS

1469 Benedito de Barber (C Collar (C), Barber (C). Chemical changes during bread-dough fermentation. VIII. Revista de Agroquimica y Tecnologia de Alimentos 27(4); 1987; 530-538 (Es).

1470 Reiss (J). Study on the formation of penicillic acid by moulds on bread. XVIII. Mycotoxins in foodstuffs. Deutsche Lebensmittel-Rundschau 84(10); 1988; 318-320

Four toxigenic fungal isolates (Aspergillus ochraceus, Penicillum viridicatum and two strains of P. cyclopium) were cultivated on whole rye and on whole wheat breads. All four moulds grew well on whole wheat bread, whole wheat bread with wheat germs and on whole wheat bread with linseed but formed no colonies on whole rye bread with and without shredded wheat. The reason for this unability to grow was the high total acid content (sauregrad) of the rye breads (> 8..5). In all wheat breads penicillic acid was never detected regardless of the mould tested. Studies with the thiol containing amino acids cysteine and glutathione suggest that interaction of mycotoxin with SH compounds in the bread may be the cause for the absence of penicillic acid. AS

1471 Sharma (HR), Rasper (VF) and van de Voort (FR). Pregelatinized rice flours in composite blends for breadmaking. Canadian Institute of Food Science and Technology Journal 21(4); 1988; 408-414

Rice flours milled from grits pregelatinized to a different degree by extrusion under varying conditions of feed moisture and extrusion temp. were tested for their dough-making and bread baking potential in mixtures with an untreated strong wheat flour. Although none of the composite mixtures was fully comparable in its functionality to the plain wheat flour control, a noticeable improvement in performance was achieved when rice flours of higher degree of pregelatinization (DG) were used in place of the unextruded material. Such mixtures were characterized by higher baking absorptions and a potential to give loaves with a less-reduced vol. and a markedly lower tendency to firm during storage. An acceptable loaf was obtained with mixtures in which up to 25% wheat flour was substituted with an equal amount of rice flour of DG over 70%. AS

1472 Sudhakar (NS), Setty (TMR), Nagarak (AS) and Udupa (K (S). Studies on the incorporation of partially hydrolysed and deodourised (PHD) fish flour in bread. Indian Journal of Nutrition and Dietetics 25(2); 1988; 44-49

In this paper the studies on the levels of incorporation of PHD fish flour in bread and their effect on the baking qualities and acceptability of the product are presented. PHD fish flour used as prepared from threadfin bream (Nemipterus japonicus) and good quality wheat flour used by bakers was used and bread was prepared by straight dough method and 60:40 sponge dough method with 5, 7.5 and 10% PHD fish flour and without PHD fish flour according to standard procedures. The results showed that breads prepared by replacing wheat flour to the extent of 5 and 7.5% level of PHD fish flour were quite acceptable. Both straight dough method and 60:40 sponge dough method were found to be suitable for the preparation of bread fortified with PHD fish flour. NGKR

Dough

1473 Bartnik (M), Jakubczyk (T) and Wrzeciono (A). Phytase activity in fermentative microflora of dough. Acta Alimentaria Polonica 13(1); 1987; 67-73

The research was intended to establish whether phytase is produced by the baker's yeast Saccharomyces cerevisiae and by the liquid preferment microflora: the yeasts Sacch. minor and lactic acid bacteria. It was found that phytase is present in Sacch. cerevisiae and Sacch. minor, and absent in lactic acid bacteria cells. The determined activity values suggest that the yeast phytase is probably of slight practical significance since it is capable of decomposing less than 5% of the total phytates in flour. AS

Rye bread

1474 Helllemann (U), Powers (JJ), Salovaara (H), Shinolser (K) and Ellila (M). Relation of sensory sourness to chemically analyzed acidity in wholemeal sour rye bread. Journal of Sensory Studies 3(2); 1988; 95-111

Sour rye breads containing varying acetic or lactic acid concn. were used as samples in Exp. 1. Assessors (N = 18) could detect difference between 0 to 2 g of added acetic acid (P < 0.02, triangle test), whereas difference between lactic acid concn. at the same level was detected at P < 0.001. In Exp. 2 five commercial rye breads were profiled by 14 assessors on a 10-cm graphical scale using 12 flavour descriptors, including desirability. Chemical detn. of pH, titratable acidity, acetic and lactic acid and NaCl concn. were made. Acetic and lactic acid concn. were strongly related to perceived sourness of odour and taste. The effect of lactic acid on pH and titratable acidity was more pronounced than that of lactic acid. Stepwise discriminant analysis of the sensory data resulted in a 57.1% success rate in discriminating among the samples (nine descriptors used), whereas the analysis of the chemical data discriminated among the samples with a 80% success rate, two variables were useful. Combination of the sensory and chemical data led to 83.3% success with twelve variables. AS

Pasta

1475 Feillet (R), Ait-Mouh (O), Kobrehel (K) and Autran (J-C). The role of low molecular weight glutenin proteins in the determination of cooking quality of pasta products. An overview. Cereal Chemistry 66(1); 1989; 26-30

The low mol. wt. glutenin proteins (LMWG) make up a major fraction of durum wheat gluten and their content in durum wheat of Gamma-45 type is higher (28%) than in the Gamma-42 type (15%). Further the recombination within the gle-B1 locus between Gamma-gliadnis and LMWG indicated that Gamma-gliadnis 42 and 45 are only genetic markers of pasta firmness and elasticity. LMWG strongly aggregate upon heat treatment, thereby contributing to pasta firmness and viscoelasticity. The surface condition of cooked pasta is significantly correlated with the content of SH + SS content of cysteine-rich (DSG) proteins of durum wheat. A new model is proposed to explain the contribution of DSG proteins to the aggregation of LMWG upon heat treatment through hydrophobic and disulphide bonds. AR

MILK AND DAIRY PRODUCTS

1476 Cavaliere (A). The ultrafiltration and reverse osmosis in the dairy industry. Industrie Alimentari 27(260); 1988; 417-422

After some considerations on the theoric standpoints of technologic process of ultrafiltration and reverse osmosis. The author search into principal applications of the above mentioned technics, particulary in dairy industry. AS

1477 Gupta (RK), Nirmal Prasad) and Prasad (DN). Use of nisin in dairy industry. Indian Dairyman 41(4); 1989; 229-233

The authors have described the properties and commercial production of nisin and its use in different indigenous milk and milk products. Aspects like inhibitory action of nisin on microorganisms, toxicological aspects, legislation, method of application and the factors affecting the loss of potency have also been briefly described. KAR

1478 Yadav (PL), Sanyal (MK) and Bhat (PN). Indigenous dairy products. Indian Dairyman 41(40); 1989; 210-214

Indigenous dairy products which are usually produced by small scale producers in India have been listed and the quality expected of these products have been briefly mentioned. A plan has been given for establishing a National Indigenous Dairy Products Research Institute. KAR

Milk

1479 Abd El-Salam (MH) and Shahein (N). Ultrafiltration of reconstituted skim milk. Journal of Dairy Research 56(1); 1989; 147-149

Permeation rates of reconstituted skim milk (RSM) during ultrafiltration compared with fresh pasteurised skim milk are described. The increase in the flux of RSM with increase in the heat treatment received during the manufacture of dried skim milk can be attributed to the heat denaturation of whey proteins. In skim milk powders the heat denaturation of whey proteins and their interaction with casein miceller would decrease the adverse effect of native whey proteins on flux of milk. Results suggest more efficiency in ultrafiltration plants using RSM particularly using high heat treated skim milk powders. MCV

1480 Banks (W), Clapperton (JL), Donald Muir (D) and Girdler (AK). Whipping properties of cream in relation to milk composition. Journal of Dairy Research 56(1); 1989; 97-105

Dietary manipulation was used to produce a similar series of milks from both Friesian and Jersey cows. The gross compositions of the milks, the fatty acid (FA) composition of the milk fats, the distribution of mol. sizes in the triglycerides of the milk fat, the melting properties of the milk fats, and the whipping properties of creams containing 360 and 400 g fat/kg were measured. Changes in gross composition and FA composition were as expected from the use of dietary oil supplements, but it was established that the mathematical relation between 18:0 and 18:1 differed between breeds, the Jersey yielding a milk fat with a lower proportion of 18:1 for a given value of 18:0. Control diets free from added fat produced milk fat with essentially unimodal triglyceride distributions, whereas fat rich diets produced bimodal distributions. The slight differences in these distributions between breeds were merely a reflections of variations in FA composition rather than in synthetic procedures. Differences in the whipping properties of creams derived from Friesian cows, but caused considerable changes in the corresponding properties of the creams from Jersey cows. The only property that behaved similarly in the creams from the two breeds was the butter time, i.e., the time taken for butter granules to form on prolonged whipping of the cream. A major determinant of the buffer time appeared to be the proportion of the fat that was molten at the temp. at which the whipping experiments were carried out. AS

1481 Deepa Pande and Mathur (MP). Enzymes in relation to UHT processing of milk. Indian Dairyman 41(5); 1989; 235-239

Origin of proteases and lipases in UHT milk, and their role in UHT milk; native proteases and lipases and bacterial proteases and lipases in milk; assay of lipase and proteases; and characterisation of these enzymes and the scope of proteases and lipases in UHT milk are the aspects covered. KAR

1482 Dejmek (P). Precision conductometry in milk renneting. Journal of Dairy Research 56(1); 1989; 69-78

A method based on conductivity measurement in milk renneting is described. Electrical conductivity can be easily measured with high precision using inexpensive equipment. On renneting, the electrical conductivity of milk decreased as viscosity increased. The sigmoidal time course of the decrease resembled the time independent of the amount of rennet and proportional to milk conductivity and its casein content. Precision conductivity measurement appears to detect a change in the way renneted caseins obstruct the path of electrolytes in milk. It detects aggregation earlier than the standard clotting test and can follow the course of aggregation for at least as long as time as dynamic rheometry does, but yields a different measure of aggregation. The concn. dependence of the conductivity change suggests that it might be directly related to the aggregated casein fraction. MCV

1483 Keane (LA), Potter (NN) and Sherbon (JW). Estimation of calcium status in selected food systems. Journal of Food Science 53(4); 1988; 1111-1112

Ionic and total dialyzable Ca in nonfat dry milk, soy protein isolate, and a 50:50 mixture of the two were estimated in dialysates before and after in vitro digestion by HCl/pepsin and panacreatin/bile. Heat pasteurization did not affect % ionic of % total dialyzable Ca, before or after digestion, for the three food systems. Digestion increased % ionic dialyzable Ca for non-fat dry milk and the mixture, and increased % total dialyzable Ca for all three food systems. After digestion, % total dialyzable Ca did not differ between the milk and mixture. Soy protein did not bind substantial amounts of Ca from the milk. AS

1484 Kroger (M), Kurmann (JA) and Rasic (JL). Fermented milks. Food Technology 43(1); 1989; 92-99

This article discusses the history, consumption, organism involved in fermented milk and related products with an emphasis on future prospects. GAR

1485 Mathur (BN) and Sarma (SC). Biotechnical methods, systems and applications in relation to milk processing. Indian Dairyman 40(11); 1988; 654-657

A general article dealing with various aspects of application of biotechnology in milk processing including application in genetically modified culture, lipolysed lipids, food sweeteners, synthesis of polysaccharides, and enhancement of nutritional quality. Health, regulatory and economic aspects have also been mentioned. KAR

1486 Venkatesh Murthy (HV). Milk hygiene and preventive measures. Indian Dairyman 41(4); 1989; 188-193

The sanitation standard and hygienic practices to be followed in every stage of handling of milk and milk products have been briefly reviewed. Legislative provisions have also been indicated. KAR

1487 Wadhwa (BK) and Jain (MK). What makes lipids so important in flavours of dairy products. Indian Dairyman 41(5); 1989; 241-246

Milk lipids act as flavour precursors of a var. of flavouring compounds in dairy products. The role of lipids as precursors of free fatty acids, alkan-2-one, lactones, aldehydes, ketones and alcohols have been described. The contribution of lipids to texture, taste and flavour perception has also been briefly explained. KAR

Milk products

1488 Sherman (JH), Danielson (ND) and Hazey (JW). Simultaneous determination of sodium, potassium, magnesium, and calcium ions in milk products by indirect photometric high-performance liquid chromatography. Journal of Agricultural and Food Chemistry 36(5); 1988; 966-969

Indirect photometric chromatography (IPC) using a cerium (III) mobile phase is used to determine Na, K, Mg, and Ca ions in milk and infant formulas. Separation is complete within 17 min. No interference from the sample matrix is noted. Relative standard deviations were 5% for Na and K and between 5 and 10% for Mg and Ca. Good agreement between the IPC results and atomic absorption spectroscopy is found. AS

Cheese

Cabrales cheese

1489 Fernandez-Salguero (J), Marcos (A), Alcala (M) and Esteban (MA). Proteolysis of Cabrales cheese and other European blue vein cheese varieties. Journal of Dairy Research 56(1); 1989; 141-145

The extent and level of proteolysis were evaluated in Cabrales and five other European blue vein cheese var. Bleu de Bresse, Danablu, Edelpizlkase, Gorgonzola and Roquefort, by analysing their different N-containing constituents and determining the degree of casein hydrolysis. The electrophoretic patterns of the caseins in the cheeses confirmed their strong proteolysis, components featuring the lowest electrophoretic mobility offering the greatest resistance to subsequent hydrolysis. Component Alpha was detected in all var. studied with the exception of Roquefort cheese. AS

Cheddar cheese

1490 Schroeder (CL), Bodyfelt (FW), Wyatt (CJ) and McDaniel (MR). Reduction of sodium chloride in Cheddar cheese. Effect on sensory, microbiological and chemical properties. Journal of Dairy Science 71(8); 1988; 2010-2020

Cheddar cheese with common salt content of 0-1.44% was prepared and evaluated for microbiological, chemical and sensory properties over a period of 7 months. Cheese with less salt content supported lactic acid bacterial populations. Consumers were unable to distinguish between cheese containing 1.44% and 1.12% NaCl content. Consumers could note differences between 1.12% and 0.73% NaCl content. Cheddar cheese with 0.73% NaCl content received acceptable overall desirability ratings. JSS

1491 Tye (TM), Haard (NF) and Patel (TR). Effects of bacterial protease on the quality of Cheddar cheese. Canadian Institute of Food Science and Technology Journal 21(4); 1988; 373-377

A heat-stable protease secreted by Pseudomonas fluorescens T25 was used to accelerate the ripening of Cheddar cheese. Additions of the bacterial protease to pasteurized milk prior to the addition of a renneting agent (porcine pepsin) in the manufacture of Cheddar cheese resulted in a product which showed a higher intensity of cheddar flavour ($P < 0.05$) and a better preference score ($F < 0.01$) within six months of aging when compared to that of the control cheese not containing the bacterial protease. Neither off-flavour nor bitterness was detected in the protease-treated cheese throughout the ripening period. The results of this study indicate that protease-T25 from Ps. fluorescens T25 may be a suitable agent to accelerate the ripening of Cheedar cheese and also to enhance cheddar flavour. AS

Ricotta cheese

1492 Modler (HW). Development of a continuous process for the production of Ricotta cheese. Journal of Dairy Science 71(8); 1988; 2003-2009

A continues process has been developed to manufacture Ricotta cheese from sweet whey and whole milk blends (80:20). The blend is heated upto 92 C acidified with 2.5% citric acid, held for 10 min, separation of curd from whey on a nylon conveyer belt. The recoveries of fat and protein were 99.6% and 99.5% resp. JSS

Sweet cheese

1493 Hill (AR) and Irvine (DM). Effects of pH on the thermal precipitation of protein in acid and sweet cheese wheys. Canadian Institute of Food Science and Technology Journal 21(4); 1988; 386-389

Anion exchange chromatography was used to measure residual Alpha-lactalbumin (Alpha-LA), Beta-lactoglobulin A (Beta-LG A), and beta-lactoglobulin B (Beta-LG B) in isoelectric supernatants of heated wheys. A study of the effects of dipping pH (6.7 and 4.6) corresponding to sweet and acid wheys, resp. and the pH (2.4-6.8) of heating (85 C, 10 min) revealed the following: (1) Precipitation of Alpha-LA in sweet whey was greater after heating at pH 4.6-6.8 than in acid whey probably due to stabilization of Alpha-LA by increased levels of CA^{++} in acid whey. There was no effect of whey var. on precipitation of alpah-LA after heating at pH 2.4-3.5; (2) Precipitation of Beta-LG A at isoelectric pH in both acid and sweet wheys was greater than that of Beta-LG B. In acid whey at pH below the isoelectric region, precipitation of Beta-LG A was greater than that of Beta-LG B; (3)

Precipitation of Alpha-LA after heat treatment at pH 2.4-3.5 was greater than that of Beta-LG but the reverse was true at pH 5.7-6.8. AS

Desserts

1494 Hanumantha Rao (K) and Balachandran (R). Recent trends in the preparation of milk based gelled desserts. Indian Dairyman 41(5); 1989; 267-271

The authors suggest for the production of ready-to-eat milk based desserts by the Indian dairies as a way of diversification in dairy industry. The desserts suggested are: sweet milk gels, acidified milk gels, fruit cream desserts, custards and puddings and the work done on these have been briefly described. KAR

1495 Murray (C). Gelling dairy desserts. Indian Journal of Medical Research 58(10); 1988; 580-582

Milk powder

1496 Furll (C). Flow characteristics of milk powders. Lebensmittelindustrie 35(6); 1988; 280-281 (De).

Whey

1497 Gandhi (DN). Production of some useful products of industrial importance through microbial fermentation of whey. Indian Dairyman 41(4); 1989; 182-184

The products covered in this article include ethyl alcohol, single cell protein, lactic acid, citric acid, wine and other fermented beverages, flavour concentrates and vitamin B 12. KAR

Whey proteins

1498 Shimda (K) and Cheftel (JC). Texture characteristics, protein solubility, and sulphydryl group/disulphide bond contents of heat-induced gels of whey protein isolate. Journal of Agricultural and Food Chemistry 36(5);

The total sulphydryl (SH) group and half-cystine contents and various properties (water-holding capacity, transmittance, firmness, elasticity, protein solubility) of gels of whey protein isolate (WPI) prepared at different protein concn., pHs, and temp. have been investigated. Assays were also carried out in the presence of N-ethylmaleimide or of NaCl. Gel texture (firmness, elasticity) is not strictly related to the total number of disulphide (S-S) bonds. At neutral and alkaline pHs, gel firmness and total SH groups decreased with increasing pH(6.5-9.5), while gel elasticity, transmittance, and protein solubility (in buffers without S-S bond-reducing agent) increased. Hydrophobic interactions and intermolecular S-S bonds caused by SH/S-S interchange reactions predominate in the WPI gel network and are probably responsible for (1) the firmer gel structure at increasing protein concn. and (2) the heat resistance at high temp. (Ca. 135 C). The high elasticity of gels at neutral and alkaline pHs may result from intermolecular S-S bonds. The gels formed at acid pHs are nonelastic and markedly solubilized in denaturant-containing buffers. Hydrogen bonds may represent the main Umolecular bonds in the network of such acid gels. AS

Milk proteins

1499 Holt (DL) and Zeece (MG). Two-dimensional electrophoresis of bovine milk proteins. Journal of Dairy Science 71(8); 1988; 2044-2050

A two-dimensional electrophoretic technique for the analysis of bovine milk proteins was developed. The first dimension separation was by isoelectric focusing in the presence of a nonionic detergent (Nonidet NP-40) and urea and utilized a modified pH gradient from pH 3 to 10. Isoelectric separation was followed by discontinuous, dissociating PAGE using a 14% acrylamide concn. for the resolving gel. This procedure is able to separate the major bovine milk caseins into classes, and to resolve at least some of the genetic variants of these classes. Beta-lactoglobulin was also resolved into two bands differing in isoelectric point. The technique was used to examine the effects of high speed centrifugation on the distribution of casein proteins in raw skim milk. AS

Caseins

1500 Chobert (J-M), Bertrand-Herb (C) and Nicolas (M-G). Solubility and emulsifying properties of caseins and whey proteins modified enzymatically by trypsin. Journal of Agricultural and Food Chemistry 36(5); 1988; 883-892

Casein and whey proteins were treated with trypsin to give, resp., 4.3, 8.0, 9.9, and 2.5, 3.9, 5.3% hydrolysis of the peptide bonds. For casein hydrolysates, all the resulting peptides had mol. wt. below 15,000, including 30%, 44%, and 33% between 5000 and 10,000 after 4.3, 8.0, 9.9% hydrolysis, resp. Of the material, 18% (4.3% hydrolysate) to 66% (9.9% hydrolysate) had mol. wt. below 5000, as determined by size-exclusion chromatography. For whey protein hydrolysates, size exclusion chromatography showed major peaks near 18000, 13000, 9000, and 5000 mol. wt. after a 2.5% hydrolysis, near 9000 and 5000 after a 3.9% hydrolysis, and near 6000 and 2000 after a 5.3% hydrolysis. A peak near 1500 was obtained with increasing intensity following increasing hydrolysis. After trypsin treatment, the solubility of the casein hydrolysis sate, was largely increased only at pH 4.0-5.0; however, the solubility of the whey protein hydrolysates was higher than that of control whey protein at all pHs. The emulsifying capacity of casein hydrolysates was increased at the isoelectric point, while with whey protein hydrolysates the emulsifying capacity was increased at alkaline pH. The emulsifying activity of the hydrolysates was higher than that of the casein and much higher than that of whey proteins. AS

1501 Haque (Z), Leman (J) and Kinsella (JE). Emulsifying properties of food proteins. Bovine micellar casein Journal of Food Science 53(4); 1988; 1107-1110

MEAT AND POULTRY

Meat

1502 Bushway (AA), Stickney (MR), Bergeron (D), True (RH), WorkTM) and Criner (GK). Formulation and characteristics of a fermented pepperoni using mutton and fowl. Canadian Institute of Food Science and Technology Journal 21(4); 1988; 415-418

A fermented pepperoni was prepared using hand deboned mutton (50%) and fowl (50%) and the chemical, physical and sensory properties of the experimental pepperoni were examined. The mution:fowl pepperoni contained 33.6% moisture, 20.2% fat and 4.3% salt. Textural measurements demonstrated that the mutton:fowl, pepperoni had a shear value of 2.99 P (Kg force/cm) and a hardness of 20.3 N (Kg-force). The Hunter a-value was 13.9. Comparison with a national brand of fermented all beef pepperoni showed the mutton:fowl pepperoni to be higher in protein, lower in fat, less red and to have a lower shear value. Sensory analysis demonstrated that the commercial all beef pepperoni was preferred for colour ($P < 0.05$) while there was no significant preference ($P > 0.05$) for texture and flavour between the experimental and commercial pepperonis. Preliminary cost of production analysis indicated that the mutton-fowl pepperoni would cost 1.76 - 2.10/kg to manufacture. AS

1503 Ybanez (N), Cervera (ML), Montoro (R) and Catala (R). Determination of cadmium copper, lead and zinc in meat, meat products, livers and animal fats, by flame atomic absorption spectroscopy. Revista de Agroquimica y Tecnologia de Alimentos 27(4); 1987; 590-598 (Es).

Beef

1504 Brain Killday (K), Tempesta (MS), Bailey (ME) and Metral (CJ). Structural characterization of nitrosylhemochromogen of cooked cured meat. Implications in the meat-curing reaction. Journal of Agricultural and Food Chemistry 36(5); 1988; 909-914

Cured meat pigment from cooked corned beef was isolated and completely characterized by IR and visible spectroscopies and shown to be identical with synthetic material that was further identified by fast atom bombardment mass spectrometry as the mononitrosyl sp. nitrosyliron(II) protoporphyrin. The ^{1}H NMR spectrum of this paramagnetic complex is reported for the first time. It was shown that this pigment can be formed from chloroiron(II) protoporphyrin by autoreduction with imidazole and nitric oxide. The same compound is formed by reacting nitric oxide gas with metmyoglobin followed by protein denaturation. These results lead to the proposal of a new mechanism for the meat-curing process involving (1) oxidation of myoglobin to metmyoglobin by nitrite, which is reduced to nitric oxide, (2) formation of the unobserved intermediate nitrosylmetmyoglobin, (3) rapid autoreduction to a nitrosylmyoglobin radical cation, (4) further reduction to nitrosylmyoglobin, and (5) formation of nitrosylhemochromogen (nitrosyliron (II) protoporphyrin) and incorporation of a second mole of nitrite into the denatured protein on heating. AS

1505 Lewis (DA) and Luh (BS). Application of actinidin from kiwifruit to meat tenderization and characterization of beef muscle protein hydrolysis. Journal of Food Biochemistry 12(3); 1988; 147-158

1506 Rolan (TL), Davis (GW), Seioleman (SC), Wheeler (TL) and Miller (MF). Effects of blade tenderization and proteolytic enzymes on restructured steaks from beef bullock chucks. Journal of Food Science 53(4); 1988; 1062-1064, 1110

1507 Weiffenbach (ST), Johnson (DD) and West (RL). Evaluation of an accelerated processing system for pre-cooked beef products. Journal of Food Science 53(4); 1988; 1051-1055, 1102

Beef patties

1508 De Vore (VR). TBA values and 7-ketocholesterol in refrigerated raw and cooked ground beef. Journal of Food Science 53(4); 1988; 1058-1061

Pork

1509 Rhee (KS), Keeton (JT), Ziprin (YA) and Bohac (JJ). Oxidative stability of batter-breaded restructured neggets processed from prerigor pork. Journal of Food Science 53(4); 1988; 1047-1050

Products

1510 Papa (F). Selective medium for lactobacilli causing green discolouration in cooked cured-meat products. Industria Conserve 63(2); 1988; 146-148 (It).

APT agar supplemented with 0.3% manganese dioxide is used as the selective medium for screening hydrogen peroxide producing lactobacilli which cause greening in cooked cured-meat products. Hydrogen peroxide-producing lactobacilli form on it colonies surrounded by a clear zone. BV

Bacon

1511 Liu (RH), Conboy (JJ) and Hotchkiss (JH). Nitrosation by nitro-nitroso derivatives of olefins. A potential mechanism for N-Nitrosamine formation in fried bacon. Journal of Agricultural and Food Chemistry 36(5); 1988; 984-987

The mechanism of nitrosation of morpholine (MOR) by 2,3-dimethyl-2-nitro-3-nitrosobutane (DNNB) was studied as a model for N-nitrosation of amines by nitro-nitroso compounds. DNNB was mixed with excess MOR in hexane and heated in sealed ampules at temp. of

143, 169, and 180 C. The reaction produced 2 mol of N-nitrosomorpholine (NMOR)/mol of DNNB consumed, leaving 1 mol of 2.3-dimethylbutene (DMB) as a byproduct. Linear pseudo-first-order kinetic plots demonstrated that the reaction rate had a first-order dependence in DNNB concn. and a zero-order dependence in MOR concn. This suggests a mechanism where DNNB thermally dissociates to N203 and DMB in a rate-limiting step, followed by rapid nitrosation of MOR. When MOR was nitrosated with the products of N_2O_3 addition to cis-3-heptene, the only 3-heptene found in the reaction mixture was the trans isomer. This and the fact that p-methoxyhaniline inhibited the formation of NMOR suggest a free-radical mechanism. With these results, a hypothesis on the mechanism of nitrosamine formation during the frying of nitrite-cured meats such as bacon is presented. AS

Ham

1512 Flores (J), Neito (P), Bermell (S) and Alberola (J). Changes in fatty acids during ham dry curing process. I. Lean meat lipids. Revista de Agroquimica y Tecnologia de Alimentos 27(4); 1987; 599-607 (Es).

1513 Pedrielli (R), Pizza (A), Franceschini (M) and Bergianti (M). Influence of pentasodium triphosphate on the yield and sensory characteristics of cooked ham. Industria Conserve 63(2)127-134;

Sausages

1514 Farber (JM), Tittiger (F) and Gour (L). Surveillance or raw-fermented (dry-cured) sausages for the presence of Listeria spp. Canadian Institute of Food Science and Technology Journal 21(4); 1988; 430-434

Samples from 96 lots of raw-fermented (dry-cured) sausages produced in federally-registered establishment in Canada were analyzed for the presence of Listeria sp. Out of 54 samples analyzed by the Health Protection Branch, five were positive for Listeria monocytogenes after fermentation. But not after the drying period. In samples analyzed by Agriculture Canada, 10 out of 42 (23.8%) were positive for L. monocytogenes before fermentation, with five of the ten remaining positive after the drying period. AS

1515 Pezacki (W) and Pezacka (W). Specific activity of tissue peptidases in fermented sausages manufactured from hot meat. Acta Alimentaria Polonica 13(1); 1987; 33-43

Changes in specific activity of cathepsins and trypsin-like tissue peptidase were analysed during the production and 40-day storage of cervelat-type fermented sausage manufactured from hot meat. The specific activity of cathepsins in such a sausage is on the av. 30% higher than in similar sausages produced from meat refrigerated for 7 days. The specific activity of the other peptidase does not differ depending on the degree of autolysis of the meat raw material. The direction of specific activity changes of the two enzymes in both kinds of the studied sausage is the same, corresponding also to changes in other experimental cycles. The activity of the enzymes is stimulated by the increasing content of common salt, or rather of its natural admixtures. The increasing concn. of salts is due to the decreasing water content in the stored sausages. AS

Poultry

1516 Keshri (RC), Sharma (N) and Joshi (HB). Proximate composition of poultry and other meats - a review. Poultry Guide 26(5); 1989; 23-28

Proximate comp. of meats of poultry, ducks and geese, guinea fowl, pigeon, cooked tandoori quail, and some mammalian meats have been briefly reviewed. KAR

1517 Mcallister (JS), Stadtherr (MP) and Fox (TL). Evaluation of the 3 M petrifilm TM culture plate method for enumerating aerobic flora and coliforms in poultry processing facilities. Journal of Food Protection 51(8); 1988; 658-659

PetrifilmTM methods were compared to traditional plating methods for monitoring microbial contamination in poultry processing facilities. No differences were seen between the petrifilm method and conventional method for enumeration of total bacterial populations, and no trends were seen in the ability of either method to detect coliforms in the naturally contaminated samples. When processed poultry products were artificially inoculated with a var. of microorganisms, no difference in efficiency of recovery of bacteria was noted. The petrifilm methods were shown to be a practical and accurate alternative for monitoring microbial levels in poultry processing facilities. AS

Chickens

1518 Lyon (BG). Descriptive profile analysis of cooked, stored, and reheated chicken patties. Journal of Food Science 53(4); 1988; 1086-1090

A trained panel evaluated off-flavour development in precooked, stored and reheated chicken patties. Factor analysis of intensity scores on 12 sensory attributes yielded three factors. Calculated Factor I scores increased with storage time and predominantly characterized cooked samples stored 2 and 3 days. Factors II and III characterized fresh, cooked product and cooked product stored 0 or 1 days. Canonical Discriminant Analysis (CDA) revealed a spatial configuration that classified storage times according to attribute subsets corresponding to Factor scores. The second and third canonical variables classified samples stored 0 and 1 day differently from other stored samples and probably represented flavour characteristics which were important indicators of flavour change occurring within 24 h or refrigerated storage. AS

1519 Politz (ML) and Cludesdala (FM). Effect of enzymatic digestion, pH and molecular weight on the iron solubilizing properties of chicken muscle. Journal of Food Science 53(4); 1988; 1081-1085, 1090

The effects of a simulated gastrointestinal pH, enzymatic digestion and mol. wt. (MW) on the iron solubilizing properties of a heated dilute salt insoluble fraction of chicken muscle were examined. The solubility of 50 p.p.m. added ferric chloride increased linearly from 0-260 min during pepsin digestion. The total soluble iron reached a max. concn. following a 120 min pepsin-30 min pancreatin digestion, with pepsin digestion products ranging in MW from 6200-2500. Solubilization capacity, defined as an in vitro measure of total iron bioavailability, did not correlate to binding by free sulphydryl groups. The soluble low mol. wt. iron chelates found may explain, in part, the mechanism by which the "meat factor" enhances iron bioavailability. AS

1520 Shiga (K), Kami (T) and Fujii (M). Relation between gelation behaviour of ground chicken muscle and soybeans proteins and their differential scanning calorimetric studies. Journal of Food Science 53(4); 1988; 1076-1080

The thermal denaturation of ground chicken muscle, soybean protein, and the mixture of both were investigated by differential scanning calorimetry (DSC) under different salt concn. The relationship between DSC analysis and the properties of heat-induced gels from these samples were determined. The DSC thermograms of ground chicken muscle showed three endothermic peaks and those of soybean protein showed two peaks. The DSC thermogram of their mixture showed three peaks. When NaCl was added to ground chicken muscle the endothermic peaks shifted to lower temp. and the rheological values of heat-induced gels increased. When NaCl was added to soybean protein, the endothermic peaks shifted to higher temp. and the rheological values of heat-induced gels decreased. AS

Broilers

1521 Ang (CYW). Comparison of broiler tissues for oxidative changes after cooking and refrigerated storage. Journal of Food Science 53(4); 1988; 1072-1075

Broiler parts were cooked in water as: split breast without bone, leg without bone, skin, liver, and depot fat. Cooked tissues from one side of the birds were analyzed for initial thiobarbituric acid (TBA) numbers while tissues from the other side were ground and analyzed after 5 days storage at 4 C. The greatest increases in TBA numbers were found in liver and breast meat followed by leg meat, skin and depot fat. The oxidation rate during storage was positively correlated with protein, water, phospholipids and nonheme iron content and negatively correlated with total lipids or neutral lipids. Major constituents might affect the tissue stability by influencing the physical or environmental conditions for oxidation process. AS

1522 Dickens (JA) and Papa (CM). A procedure for measuring excised muscle contraction. Journal of Food Science 53(4); 1988; 1056-1057, 1061

A procedure was developed to accurately measure the contraction of excised Pectoralis major muscles (along the longitudinal axis) from broilers during the development of rigor. A linear variable differential transformer (LVDT) and computer equipment were used to continuously monitor contraction through the course of rigor. A holding tank was designed and constructed and in conjuction with the LVDT allowed cooling of the muscle while contraction was being monitored over a predetermined time period. Applying the procedure to broiler Pectoralis major muscles, the results indicated much less variation using the LVDT in comparison with a technique of manual measurement; however, mean values were not significantly different. AS

Pigeon

1523 Bordoloi (JP), Barua (KK), Bora (NN) and Barua (KK). Carcass yield of pigeon reared under different housing and feeding systems. Poultry Guide 26(6); 1989; 75-79

Carcass yield of 92 pigeons reared upto 7 wk, separately in cages and floor condition by feeding diet with 22% protein were studied. Irrespective of the age the dressed yields were slightly higher in birds kept in cages than in those reared in deep litter. Per cent dressed yield, eviscerated yield and yield of cut-up parts were not significantly affected by the housing type of level of protein in the diet. Among the various cut-up parts breast constituted the highest cut followed by wings, back, neck, thighs and drumsticks. It was concluded that carcass yield was better when pigeons were slaughtered at 5th wk of age irrespective of housing system and dietary protein. KAR

Turkeys

1524 Elkhalifa (EA), Graham (PP), Marriott (NG) and Phelps (SK. Colour characteristics and functional properties of flaked turkey dark meat as influenced by washing treatments. Journal of Food Science 53(4); 1988; 1068-1071, 1080

Effects of potassium phosphate and sodium acetate washing procedures on the composition, colour characteristics, and functional properties of turkey dark meat were determined. All evaluations were compared to control thigh and breast tissues. Higher moisture and lower protein, fat and ash ($P < 0.05$) were found in tissues subjected to washing. Concn. of sarcoplasmic protein was reduced ($P < 0.05$) by washing. Hunter L, a and b colour values were changed ($P < 0.05$) to a colour similar to breast meat by washing. Washed tissues, due to higher moisture, had less cooking loss in water and their protein solubility values increased with salt concn. Emulsifying capacity (EC) values were not reduced ($P < 0.05$) due to washing. Phosphate-washed tissue stabilized a test emulsion better than the control and acetate/phosphate-washed thigh tissues. AS

Products

Poultry

Eggs

1525 Kitabatake (N), Shimizu (A) and Doi (E). Preparation of heat-induced transparent gels from egg white by the control of pH and ionic ale yeast. Segregants of the recombinants obtained showed great instability in protease secretion and were unsuitable for brewing purposes. The potential advantages and drawbacks to this approach are discussed. AS

Zygosaccharomyces rouxii

35 Lenovich (LM), Buchanan (RL), Worley (NJ) and Restaino (L). Effect of solute type on sorbate resistance in **Zygosaccharomyces rouxii**. **Journal of Food Science** 53(3); 1988; 914-916

The effect of sorbate on the growth of **Zygosaccharomyces rouxii** was evaluated at reduced water activity using sucrose, glucose and polyethylene glycol(PEG). Sorbate adapted and unadapted cells were grown aerobically at pH 5.0 in media adjusted to 0.92 water activity by addition of the solutes. Sorbate resistance by unadapted cells increased in the order of glucose < PEG < sucrose. Solute type had little effect on sorbate resistance by sorbate -adapted cells in media containing glucose and sucrose. The combination of PEG and 400 µg/mL sorbate was less inhibitory to sorbate-adapted cells than PEG with 0 µg/mL and 800 µg/mL of sorbate. AS

Zymomonas mobilis

36 Ingram (LO) and Conway (T). Expression of different levels of ethanologenic enzymes from **Zymomonas mobilis** in recombinant strains of **Escherichia coli**. **Applied and Environmental Microbiology** 54(2); 1988; 397-404

The expression of **Zymomonas mobilis** genes encoding pyruvate decarboxylase and alcohol dehydrogenase II in **E. coli** converted this organism from the production of organic acids to the production of ethanol. Ethanol was produced during both anaerobic and aerobic growth. The extent to which these ethanologenic enzymes were expressed correlated with the extent of ethanol production. The replacement of organic acids with ethanol as a metabolic product during aerobic and anaerobic growth resulted in dramatic increase in final cell density, indicating that these acids (and the associated decline in pH) are more damaging than the production of ethanol. Of the plasmids examined the best plasmid for growth and ethanol production expressed pyruvate decarboxylase and alcohol dehydrogenase II at levels of 6.5 and 2.5 lµ/mg of total cell protein, resp. RJ

Hygiene

37 Bryan (FL), Michanie (SC), Alvarez (P) and Paniagua (A). Critical control points of street vended foods as the Dominican Republic. **Journal of Food Protection** 51(5); 1988; 373-383

Data relating to aerobic mesophilic colony count (AMCC) and **Clostridium perfringens** counts of street vended samples collected at different critical points of their preparation in Dominican Republic are presented. The samples consisted of fried fish, fried chickens, fried pig's head pieces, fried ham, fried pork ribs with rind attached drinking water etc., from the three stands. During the interval of holding AMCC progressively increased with time from an initial count of 10^3 g after cooking to 10^5 - 10^6 g. The higher counts were usually associated with samples held overnight. **E coli** in water, milk and cheese samples, **Bacillus cereus** in bean and rice samples and **C. perfringens** in bean rice samples were present in less than 10^3 g. Many sanitary deficiencies have been noted. The need and suggestions for implementing educational activities for prevention and control of microbial hazards are presented. CTD

BIOTECHNOLOGY

38 Esser (K) and Kamper (J). Transformation systems in yeasts. Fundamentals and applications in biotechnology. **Process Biochemistry** 23(2); 1988; 36-42

This review covers the information on transportation vehicle for transformation (vector); its insertion and the expression of foreign DNA in host cells using the yeast **Saccharomyces cerevisiae** as an example. This describes insertion of the vector, gene expression and conclusions. NGKR

TISSUE CULTURE

39 Drew (RA). Rapid clonal propagation of papaya in vitro from mature field-grown trees. **HortScience** 23(3); 1988; 609-611

FOOD ADDITIVES

Flavourings

40 Ney (KH). Use of flavourings in foods. **Gordian** 87(4); 1987; 58 (De).

Discusses application of flavours in food products. The complexity of an edible fungus (**Boletus**) in flavours is illustrated by an aromagram. Also covered briefly is the choice and range of optimal flavour products (solid, liquid, micro-encapsulated), storage, dosage and quality control. BV

41 Tateo (F), Ciserchia (E), Triangeli (L) and Verderio (E). Fundamental principles for the use of solvents and support matters in the production of flavourings. **Industrie Alimentari** 27(156); 1988; 19-26, 29 (It).

The note reports a comparative description of solubilities for some essential oils having a very different origin in four following solvents: diethylene glycol monoethyl ether, propylene glycol, diacetin, and triacetin. The results point out some problems which are not strength of the medium. Journal of Food Science 53(4); 1988; 1091-1095, 1106

Egg white was dialyzed against distilled water or diluted with water, and the precipitates formed were removed by centrifugation. The supernatant gave a transparent gel after being heated at an acidic pH (2-4). At other regions of pH, except for the highly alkaline region, the gel or suspension was turbid upon heating. Insufficient centrifugation of the dialyzed egg white or the addition of NaCl to the supernatant after centrifugation resulted in a turbid gel on heating at even acidic pH. The removal of the slight precipitate formed at low ionic strength and the maintenance of low ionic strength during heating were both necessary for production of a transparent gel. AS

Egg albumen

1526 Durance (TD) and Nakai (S). Simulataneous isolation of avidin and lysozyme from egg albumen. Journal of Food Science 53(4); 1988; 1096-1102

A single column cation exchange method was developed which allowed simultaneous recovery of lysozyme and avidin from undiluted egg white. A unique application-elution sequence was developed, involving accumulation of avidin on the column through several cycles of egg white application and lysozyme elution. Lysozyme was recovered with higher yields than reported for the isoelectric precipitation methods often used in the industry (86% vs 60-80%). Lysozyme peaks appeared homogeneous on SDS-PAGE. Avidin recovery was also as good or better than that of previously reported ion exchange methods (74%-80%). The purity of the avidin fraction(up to 40.9%) was superior to that of other reported primary avidin fractions. AS

Egg yolks

1527 Tsutsui (T). Functional properties of heat-treated egg yolk low density lipoprotein. Journal of Food Science 53(4); 1988; 1103-1106

Egg yolk low density lipoprotein (LDL) was heated at various temp. from 55 C to 100 C, for 5 min and transmission, extractability of lipid, emulsifying property and foaming property of each solution were examined. Transmission of LDL solution decreased for treatments above 60 C and was almost 0 at 75 C. Above 70 C, lipid extractability gradually decreased with increase of treatment temp. Emulsifying property and apparent viscosity were significantly correlated with the extractability of lipid. AS

SEAFOODS

Fish

1528 Ackman (RG) and McLeod (C). Total lipids and nutritionally important fatty acids of some Nova Scotia fish and shellfish food products. Canadian Institute of Food Science and Technology Journal 21(4); 1988; 390-398

Public interest in the lipids of food product fish and shellfish has gone beyond a mere interest in cholesterol content and the total unsaturation of the fatty acids. It now includes specifically the content of eicosapentaenoic acid as well as other fatty acids of the linolenic or "omega-3" family. This report tabulates lipids, key fatty acids, and cholesterol contents for 72 products available in Nova Scotia and adjacent provinces. Several unfamiliar sp. are included since all available familiar fish and shellfish are now utilized and new resources must be tapped to supply the demand for fishery products. A limited number of canned and processed products are also included. AS

1529 Jimenez-Colmenero (F), Tejada (M) and Javier Borderias (A). Effect of seasonal variations on protein functional properties of fish during frozen storage. Journal of Food Biochemistry 12(3); 1988; 159-170

Influence of seasonal variation (February, July and October), time elapsed before freezing, and type of processing of the muscle on several functional properties (protein solubility, emulsifying capacity, and viscosity) in two sp. of fish with differing seasonal behaviour (hake and sardien) were studied. Correlations between the changes in these functional properties during frozen storage were established. Although proximate analyses of the hake muscle were similar throughout the yr. Significant differences were observed in viscosity and protein solubility during storage between lots of fish caught in different seasons. Changes in the functional properties were less evident in sardine, which undergoes wide seasonal variations. The larger differences in the functional properties of hake muslce, depending on season, were related to differences in the dimethylamine content after the fifth month of frozen storage. High correlations were established between functional properties in fish caught in the same or different seasons. Any of the three functional properties studied can be used as a suitable index of the quality of frozen fish, irrespective of the different conditions studied. AS

1530 Prell (PA) and Sawyer (FM). Flavour profiles of 17 species of North Atlantic fish. Journal of Food Science 53(4); 1988; 1036-1042

A modified traditional flavour profile method was used by a trained panel to develop sensory profiles of the cooked muscle of 17 species of North Atlantic fish. Sp. were characterized for aroma and flavour total intensity, amplitude, order and intensity of character notes, and aftertaste. This information provides a data base for grouping sp. according to similarities in their characteristics. Flavour data were analyzed by cluster procedures and revealed four distinct groupings characterized by: (1) less than moderate total flavour intensity with a shellfish note; (2) less than moderate total flavour intensity with an earthy note; (3) a moderate flavour intensity with fish oil, gumey and sour notes; (4) high total flavour intensity with fish oil, sour, and stronger gumey notes. AS

1531 Sanjeev (S) and Mahadeva Iyer (K). Antibiotic resistance of Staphylococcus aureus strains isolated from fish processing factory workers. Fishery Technology 25(2); 1988; 139-141

Antibiotic resistance pattern of Staphylococcus aureus (122 strains) isolated from throats and palms of workers from 6 fish processing factories situated in and around Cochin was studied. The antibiotics used for sensitivity tests were ampicillin, chloramphenicol, erythromycin, kanamycin, neomycin, penicillin, polymixin-B, streptomycin and tetracycline. Resistance was max. towards ampicillin (64.75%) followed by penicillin (59.84%). Resistance towards tetracycline, polymixin-B, erythromycin, kanamycin, neomycin, chloramphenicol and streptomycin were 22.95, 16.39, 7.38, 5.74, 3.28 and 1.64% of the isolates resp. KAR

1532 Thiagarajan (R) and Kandoran (MK). Effect of demonstration in transferring fish processing technology. Fishery Technology 25(2); 1988; 147-150

A group of 28 fisherwomen who attended demonstration on the preparation of fish wafers, fish pickles and fish soup powder showed significant knowledge and skill gain for all the three messages. The total knowledge and skill gain was max. for preparation of fish wafers followed by fish soup powder and fish pickles preparation. KAR

Cod

1533 Chawla (P), MacKeigan (B), Gould (SP) and Ablett (RF). Influence of frozen storage of microsomal phospholipase activity in myotomal tissue of Atlantic cod (Gadus morhua). Canadian Institute of Food Science and Technology Journal 21(4); 1988; 399-402

The impact of frozen storage on the detectable activity of endogenous phospholipase was evaluated in a microsomal fraction isolated from myotomal tissue of Atlantic cod (Gadus morhua) stored up to 12 wks. at -30 C. In comparison to initial levels, enhanced phospholipase activity was detected up to eight wks of frozen storage at -30 C, but this was significantly reduced on further storage to 12 wks. Under the same conditions and in comparison to 0 wks, microsomal membrane-bound and cytosolic enzymes including 5' nucleotidase, acid phosphatase and succinic dehydrogenase showed a linear decline of detectable activity over the same 12 wks period. It is concluded that protein denaturative changes in the cellular matrix of myotomal tissue likely account for an overall decline of microsomal membrane-bound and cytosolic enzymes during frozen storage at -30 C, but that phospholipase showed a marked level of resilience to denaturation. AS

1534 Pellegrino (C), Giaccone (V) and Ponzoni (N). Microbiological analysis of ready to use cod-fish. Ist. Industrie Alimentari 27(261); 1988; 541-545, 550 (It).

Cod-fish in some commercial preparations (such as salted cod and klippfish) has always represented a very important nutritional source. At present, the fish-industry has specialized in a var. of ready-to-use products. Samples of these products were analyzed microbiologically. In order to establish their real commercial quality 5 samples of salted cod, 14 of klippfish and 11 of salted filletted cod have been examined. On each sample were checked up: total viable mesophilical count (+ 30 C) and the psychrophilical one (+ 7 C), both on the surface and in depth, at 2 different salinities (3% and 7%).; isolation of Pseudomonas spp. as examples of a typical Gram-negative spoiler; reseach of moulds and yeasts; detn. of the pH-value; On the ground of test's results it is concluded that: pH-value is a suitable method for testing the quality of these salted products-the isolation of Pseudomonas spp. and resp. of moulds and yeasts has always proved as negative. AS

Mackerels

1535 Middle Brooks (BC), Toom (PM), Douglas (WL), Harrison (RE) and McDowell (S). Effects of storage time and temperature on the microflora and amine development in Spanish mackerel (Scomberomorus maculatus). Journal of Food Science 53(4); 1988; 1024-1029

Microbial content was characterized and levels of three amines (histamine, cadaverine, and putrescine) were determined in Spanish mackerel (Scomberomorus maculatus) decomposed at 0, 15, and 30 C for varying lengths of time. Correlations were shown (1) between the levels of the histamine, cadaverine, and putrescine and the time and temp. of decomposition, (2) between the ratios of cadaverine/histamine and putrescine/histamine levels and the temp. of decomposition, and (3) between increasing total microbial counts and raising amine levels. A total of 14 bacterial sp. with histidine decarboxylase activity were isolated from decomposing fish, including three sp. (Acinetobacter lwoffi, Pseudomonas putrefaciens, and Aeromonas hydrophila) not previously reported to have the potential to produce histamine. AS

Mullets

1536 Fleteher (GC) and Statham (JA). Shelf-life of sterile yellow eyed mullet (Alolrichetta forsteri) at 4 C. Journal of Food Science 53(4); 1988; 1030-1035

The relative effects of microbial and nonmicrobial spoilage on the shelf-life of yellow-eyed mullet were studied. Results of sensory and chemical analyses of sterile flesh stored at 4 C were compared with fillets which had either spoiled naturally while held at 4 C or frozen fillets held at -18 C. Inosine was produced rapidly in both treatments at 4 C, followed in sterile flesh by a slower breakdown to hypoxanthine. Hypoxanthine production from inosine was rapid in the presence of bacteria. Within 6 days sensory changes were observed in the frozen flesh and after 69 days, it was considered unacceptable. The development of off-odours and off-flavours in the absence of bacteria was not sufficiently slow to result in a significant extension in shelf-life for this sp. AS

Salmon

1537 French (JS), Kramer (DE) and Kennish (JM). Protein hydrolysis in coho and sockeye salmon during partially frozen storage. Journal of Food Science 53(4); 1988; 1014-1017, 1029

Coho (Oncorhynchus kisutch) and sockeye salmon (O. nerka) were held at 0, -1, -2, -3, and -20 C for up to 25 days. Hydrolysis of individual soluble proteins was analyzed by SDS-PAGE. The highest rates of hydrolysis were in fish held at -2 C and -3 C. Several proteins were present in nearly constant ratios. Significant changes were observed in nine other protein bands. A 35,000 dalton protein was present only in coho salmon. This protein appeared with a half-time of five days and then disappeared. Major changes were observed in 34,000 and 36,000 dalton proteins; half of which were hydrolysed in 7 to 20 days. A 32,000 dalton protein was half-hydrolyzed in 14-23 days in sockeye but very slowly in coho salmon. AS

1538 Wekell (JC) and Teeny (FM). Canned salmon curd reduced by use of polyphosphates. Journal of Food Science 53(4); 1988; 1009-1013

Significant reduction of curd in canned salmon prepared from frozen fish was achieved. Prior to being placed in the can, salmon steaks or, pieces were given dips of a few seconds to 2 min in sodium polyphosphate in concn. from 5% to saturated. Curd was effectively reduced in canned pink and sockeye salmon prepared from fish in frozen storage for up to a yr, to a level at least equivalent to canned salmon prepared from fresh fish. Improvements in flavour and texture were noted. A simple scoring systems is presented for evaluating canned salmon based upon visual scoring of curd present on the surface of canned product. AS

Sardines

1539 Baldrati (G), Carpi (G), Ambroggi (F), Incerti (I) and Versitano (A). Manufacture of sardine paste and dried flakes. Industria Conserve 63(2); 1988; 135-141 (It).

Describes a simple technique to process beheaded and gutted sardines into a base paste which can be stored at low temp. under vacuum and used in the formulation of new products such as heat sterilized fish balls and spreads. The paste, after addition of wheat flour and antioxidants, can be further produced into dried flakes with high protein content, particularly suitable for use as meat extenders. Also discussed are the influence of the proximate comp. of the raw material on yields in paste and dried flakes and chemical, sensory and nutritional evaluations of the two products. BV

Threadfin bream

1540 Lekshmy Nair (A), Stephen (J), Vasanth Shenoy (A) and Gopakumar (K). Nutritional evaluation of texturised meat from Nemipterus japonicus. Fishery Technology 25(2); 1988; 127-131

The nutritional quality of texturised fish meat from threadfin bream (Nemipterus japonicus) was evaluated. The protein content was very high (86.92%) with all the essential amino acids present in higher levels. Lysine amounted to 11.0 g/16 g N of which 75% was biologically available. The PER of texturised meat ranged between 2.7 and 3.0 and the net protein utilization was 83. KAR

Whitefish

1541 Krivchenia (M) and Fennema (O). Effect of cryoprotectants on frozen whitefish fillets. Journal of Food Science 53(4); 1988; 999-1003

Whitefish fillets Coregonus cupleaformis were treated with sodium tripolyphosphate (STP), monosodium glutamate (MSG) or a high-pH buffer by high pressure injection, then frozen and stored at -12 C. Control samples included untreated fillets stored at -12 C and -60 C, and STP-dipped fillets (-12 C). Samples treated with STP or high-pH buffer showed better textural properties (reduced centrifugal drip, cooked drip and firmness) than untreated control samples. High pressure injection of STP was not significantly better and sometimes less effective than surface application. Sensory analysis at 18 wk revealed that STP-treated samples (-12) were significantly preferred over untreated control samples (-12 C) but not over -60 C control samples. AS

1542 Krivchenia (M) and Fennema (O). Effect of cryprotectants on frozen burbot fillets and a comparison with whitefish fillets. Journal of Food Science 53(4); 1988; 1004-1008, 1050

Burbot fillets (Lota lota) were injected with sodium tripolyphosphate (STP), monosodium glutamate (MSG), a high pH buffer or an antioxidant mixture (BHA, propyl gallate and citric acid) under high pressure, then frozen and stored at -12 C. Control samples included untreated fillets stored at -12 C and -60 C, and STP dipped fillets. Samples treated with STP or the high-pH buffer had better textural properties than untreated control samples. Samples injected with STP exhibited no improvements as compared to the dipped STP samples and in some respects were worse. Burbot and whitefish have very different textural properties; however, the patterns of change during frozen storage are quite similar. AS

Prawns

1543 Damle (SP), Garg (DK), Nambiar (VN) and Valsan (AP). Influence of time-lag on quality variation in non-penaeid prawns. Seafood Export Journal 21(1-2); 1989; 11-13, 15-16

The non-penaeid prawns (i) Acetes indicus and (ii) Palaemon tenuipes are caught in four hauls, each haul is having a gap of 6 h and are landed after collecting the catch of the four hauls. Observations were made independently for the four hauls of fresh and sun-dried (i) and (ii) for texture, odour, colour, overall appearance, total volatile N, and bacterial count. In both the prawns correlated well with the physical and organoleptic observations. In the first two hauls of fresh prawns total volatile N and bacterial counts were high and this was also observed after sun-drying the products. The dried product of first and second haul was discoloured with the development of smell. Suggestions have been listed to improve the quality of the first two hauls of the prawns. KAR

Shrimps

1544 Simpson (BK), Marshall (MR) and Steven Otwell (W). Phenoloxidases from pink and white shrimps. Kinetic and other properties. Journal of Food Biochemistry 12(3); 1988; 205-217

The kinetics and some other properties of phenoloxidases(PO) from two sp. of shrimp which undergo melanosis to varying degrees have been described in this paper. These enzymes were isolated and purified from white shrimp (Panaeus setiferus) and pink shrimp (P. duorarum). It was found that the enzyme from each source migrated as a single protein band in polyacrylamide gels with mol. wt. of 30,000 for white shrimp PO and 40,000 for pink shrimp PO. Both enzymes were inhibited by PABA and NaN3. Pink shrimp PO oxidised DOPA at rates 1.8 times faster than white shrimp PO. It was also indicated by amino acid analysis that pink shrimp had relatively higher levels of tyrosine and phenylalanine than white shrimp. NGKR

Products

Fish

1545 Gopalakrishna Iyer (TS) and Shrivastava (KP). Incidence and low temperature survival of coagulase positive staphylococci in fishery products. Fishery Technology 25(2); 1988; 132-138

No coagulase-positive staphylococci were found in frozen lobsters, cuttle fish, cat fish, seer fish and red snapper. 38% of the cooked frozen shrimps, contained coagulase-positive staphylococci and only 16% of the staphylococcal had counts more than 100/g. In headless, peeled and deveined, and peeled undeveined shrimps the incidence of the organism was 6, 12, and 16% resp. The overall results indicated that incidence of coagulase-positive staphylococci was not serious problem in processed frozen fishery products. In cooked shrimps the % destruction during freezing at -40 C was between 8-15%. In the subsequent storage at -20 C in 6 months most of the test strains lost viability. In raw shrimps the percentage of destruction during freezing was between 40-50% and in subsequent storage. In about 5 months all the strains lost their viability. KAR

1546 Lakshmanan (PT). Levels of cadmium in seafood products. Fishery Technology 25(2); 1988; 142-146

The concn. of total Cd were determined in 448 samples of processed fishery products comprising crustaceans, molluscs, marine fish and brackish water fish. Shrimp product contained on an av. 0.112 p.p.m. Cd and 20% of crustaceans analysed did not contain detectable levels of Cd. Average content of Cd in 68 marine fish of 9 sp. was 0.153 p.p.m. and Cd was absent in 35% of the samples. Of the total number of crustaceans analysed only 2% showed 0.5 p.p.m. Cd. All the 174 samples of molluscan products, except 3 canned oysters, showed Cd concn. far below the limit allowed. The av. Cd content in molluscan products was 0.552 p.p.m. KAR

Salami

1547 Yen (JR), Brown (RB), Dick (RL) and Acton (JC). Oxygen transmission rate of packaging films and light exposure effects on the colour stability of vacuum packaged dry salami. Journal of Food Science 53(4); 1988; 1043-1046

Colour and nitrosoheme pigment stabilities of dry salami packaged in films differing in oxygen transmission rate (OTR) were studied. Product exposed to light for 8 wks had greater ($P < 0.05$) retention of redness properties (Judd-Hunter + a coordinates, a/b ratios, hue angles (Theta), and saturation (S) index values) and greater ($P < 0.05$) nitrosoheme pigment stability as the OTR of the packaging film decreased from 90 cc oxygen/m^2 / 24 h to less than or equal to 11 cc oxygen/m^2 / 24 h. Redness properties and percent nitrosoheme pigment progressively decreased ($P < 0.05$) during light exposure . Significant redness fading occurred in light-exposed product when compared to dark-stored product. Oxygen transmission to the dry salami surface was a major factor in colour loss, primarily of light energy was also present. AS

PROTEIN FOODS

Infant foods

1548 Thompkinson (DK) and Mathur (BM). Formulated infant foods- a prospective. Indian Dairyman 41(5); 1989; 247-250

The authors briefly review the wide range of infant food formulations developed all over the world which includes those based on soy. In India a var. of formulations which are based on bovine milk have also been developed. Gross composition of a few infant formula marketed in India have been tabulated. KAR

Weaning foods

1549 Usha Chandrasekhar Bhooma (N), Reddy (S). Evaluation of a malted weaning food based on low-cost locally available foods. Indian Journal of Nutrition and Dietetics 25(2); 1988; 37-43

In this investigation low-cost, high density, low viscosity, food formulation prepared by using local foods and household technology is described and evaluated on infants. The formulation was prepared from malted ragi (finger millet), malted horsegram and roasted groundnut in 65:25:10 ratio. Acceptability studies were carried out with 50 infants of 3-9 months age group and tested after completion of eating. Evaluation was done based on anthropometric measurements of the children including crown-heel length, wt. and arm and chest circumference. One hundred g of the formulation provides 13 g protein and 351 K cal which is equal to one third of all nutrients including protein and energy requirements. The commercial processed foods are about 10 to 15 times costlier than this formulation. Polythene bags are more suitable and easy containers for storage for 45 days at the household level. NGKR

ALCOHOLIC AND NON-ALCOHOLIC BEVERAGES

Alcoholic beverages

Beer

1550 Manger (H-J) and Wolf (HH). About the application of surplus brewer's yeast in distilleries. Lebensmittelindustrie 35(6); 1988; 269-270 (De).

The possibilities to increase the yield in distillery under the aspect of the application of surplus brewer's yeast is analysed. Conclusion from tests about the application of the surplus yeast in cereal distillery is given. BV

Wines

1551 Konieczna (E), Wzorek (W), Pikto-Pietkiewicz (M) and Tobolska (M). Attempts at shortening madeirization of fruit wines by the method of sherrization. Acta Alimentaria Polonica 13(1); 1987; 45-55

Studies were made to check the possibility of shortening the time of madeirization of fruit wines by performing submerged sherrization (at 18 C for 10 days) prior to a 7-14-day process of heating at 45 C. Madeirization at 55 C for six wks was performed for comparison. Single fruit wines (apple, strawberry and currant) as well as mixtures of these wines were processed. AS

1552 Mahler (S), Edwards (PA) and Chisholm (MG). HPLC identification of phenols to Vidal Blanc wine using electrochemical detection. Journal of Agricultural and Food Chemistry 36(5); 1988; 946-951

High-performance liquid chromatography with electrochemical detection was used to identify eight non-flavonoid phenols in Vidal Blanc wines. Identifications were made by comparing both the capacity factor (K) and electrochemical behaviour of wine phenols to those exhibited by pure phenols in standard solutions. More components were identified by electrochemical detection than by photodiode array techniques. AS

Non-alcoholic beverages

1553 Roth (HA), Radle (RL), Gifford (SR) and Clydesdale (FM). Psychophysical relationships between perceived sweetness and colours in lemon and lime flavoured drinks. Journal of Food Science 53(4); 1988; 1116-1119, 1162

The effect of colour, as measured on the Gardner XL-23 colorimeter, on the sweetness perception of a series of lime and lemon-coloured and flavoured beverages was quantified by taste panelists using magnitude estimation. The regression lines for each coloured series in the lemon drinks were found to differ significantly ($P < 0.05$) indicating that colour had a significant effect on sweetness and the inequality of the slopes of the lines obtained when sweetness was plotted versus log colour further confirmed this effect. A sucrose level of 4.4% maximized the effect of colour on sweetness perception in both the line ($P < 0.01$) and lemon ($P < 0.05$) drinks. AS

Cider

1554 Scott (JA). Application of cross-flow filtration to cider fermentations. Process Biochemistry 23(5); 1988; 146-148

The work on ultra and microfiltration for cell separation from completed cider broths in terms of flux decline, cross flow velocity, broth temp. and cell concn. is described in this paper. The clarification of microbial broths is a vital but time consuming processing stage and a study of the effects of membrane pore size, temp. and cross flow velocity indicated the important role these play in determining the filtration flux rate. NGKR

Coffee

1555 Babu Prasad (K). Trends of coffee drinking habits in the traditional areas. Indian Coffee 53(5); 1989; 6-10

A survey report on coffee consumption in four cities (Madras, Mangalore, Belgaum and Madurai) of South India. 86% in Madras, 84% in Madurai, 70% in Mangalore and 20% in Belgaum consume coffee daily. Coffee drinking is high in 21-30 yrs. age group. Coffee is viewed as a costly drink than tea especially by the lower income group. KAR

1556 Karasawa (K). Sophisticated roaster/brewer from Japan. Tea and Coffee Trade Journal 160(11); 1988; 16-17

This article describes a fully automatic infrared roasted coffee maker capable of brewing coffee directly from beans. All operations from roasting to cooling, milling, dripping and heat retention are automatic. This machine can be selectively used only for either roasting or for coffee extraction from roasted coffee beans or powder.

A small coffee roaster of electric hot air jetting system has also been described in this article. These machines have been developed by commercial firms from Japan. NGKR

1557 Lee (S). Medical study shows asthma less frequent among coffee drinkers. Tea and Coffee Trade Journal 160(11); 1988; 3-4

This review discusses various aspects of medical studies on the effects of coffee drinking by the consumers which confirmed the earlier observations that coffee beverages containing caffeine expand the bronchial passages of asthmatics permitting easier breathing. This also covers popular methods of medication based on theophylline, a very close relative of caffeine for its beneficial effects on asthma patients. NGKR

1558 Mann (RS) and Gupta (SK). Coffee complete. Indian Dairyman 41(4); 1989; 186-187

Coffee complete is a product ready for reconstitution containing milk, sugar and coffee. Attempts made by different people in the production process for coffee complete in various parts of the world and its physico-chemical properties and storage aspect have been briefly mentioned. KAR

1559 Severini (C), Mastrocola (D), Nicoli (MC) and Dalla Rosa (M). Kinetics of volatile compound extraction. Industrie Alimentari 27(261); 1988; 537-540 (It).

In this work volatile compound extraction kinetics of coffee brew has been studied by head-space gas chromatographic analysis (HS-GLC) during coffe brewing. Experimental conditions data showed that volatile compound extraction is similar to soluble solid extraction. Soluble solids and volatile compounds showed to follow a first order kinetic. In fact the max. of the extraction was realized in the first fractions. Samples of different fractions of coffee brew have been tested; it has been possible to verify good response of provisional equation that could be used to forecast the effects of high dilutions of coffee beverage on chemical and organoleptic characteristics. AS

Fruit juices

1560 Sanchez Perez (A), Gomez Barez (JA) and Hernandez Mendez (J). Potentiometric titration of citrate using a dropping copper amalgam electrode-II. Application to orange and lemon juices. Revista de Agroquimica y Tecnologia de Alimentos 27(4); 1987; 563-568 (Es).

A potentiometric method using a copper amalgam electrode for the titration of citrate anion with Cu(II) in sodium bicarbonate medium was used for the analysis of citric acid and citrate contents in natural orange and lemon juices. The same samples were also analysed by the spectrophotometric method based on the formation of coloured sp. when citric acid and citrates are treated with metol and potassium dichromate, at pH = 3.3. The results obtained with both techniques were in good agreement, as shown by statistical analysis ("F" Snedecor and "t" Student criteria and regression equations). AS

1561 Schwedt (G) and Hauck (M). Micro-titre-plate photometry for enzymatic analyzation, as demonstrated on fruit juices. Deutsche Lebensmittel-Rundschau 84(12); 1988; 392-394 (De).

Photometrical analyses using micro-titre plates have so far only been described for clinical/chemical analyses in the visible range from 405 nm on. Detn. of glucose/fructose/saccharose as well as L-malate, D-isocitric acid and L-lactate in various fruit juices in comparison with manual procedures has manifested the advantages of micro-titre-plate photometry also in the field of food analyzation. They are mainly a lower consumption of reagents and a higher analyzing speed. AS

1562 Weiss (HO). Improvement of cloud stability and mouthfeeling. Flussiges Obst 55(12); 1988; 704-706 (De).

Citrus juices

1563 Rother (H). Cell culture to produce citrus juice. Flussiges Obst 55(12); 1988; 697-698, 699 (De).

Kafir

1564 Garg (SK). Kafir, a cultured carbonated beverage. Indian Dairyman 41(4); 1989; 198-200

Kafir is a product of mixed acid, alcohol and gassy fermentation and is an ideal self carbonated drink of USSR. Use of Kafir grains as starter material, microflora and preservation of Kafir grains, and manufacture of Kafir are the aspects covered. KAR

Tea

1565 Katusin-Razem (B), Matic (S), Razem (D) and Mihokovies (V). Radiation decontamination of tea herbs. Journal of Food Science 53(4); 1988; 1120-1126

The incidence and microbial load of several tea herbs on the retail market are high and decrease approx. in the order: chamomile flowers, mint leaves, linden flowers, and dog-rose hips. Irradiation is proposed as an adequate decontamination method and the radiosensitivity of contaminating microflora is measured. Combining the knowledge of the initial contamination and the radio resistance of the contaminants, the dose requirement for efficient decontamination can be calculated. The dose satisfying commercial requirements does not exceed 10 KGy. Chemical changes in pharmacologically active components and those essential for the appearance and aroma of tea herbs were investigated. No changes of the yield and composition of ethereal oils, colour pigments, polyphenols, and carotenoids were found at doses up to 10 KGy. AS

1566 Narayan (MS), Bhattacharya (B), Dhanaraj (N) and Seshadri (R). Free and bound triacontanol in tea leaves. Journal of the Science of Food and Agriculture 43(3); 1988; 229-233

A direct gas chromatographic method of identification and detn. of 1-triacontanol, a plant growth substance, in tea leaves is reported. Treatment of the tea leaves with calcium oxide releases more triacontanol, showing that the compound occurs also in a bound form in tea leaves. AS

1567 Powers (JJ). Mathematics of a lady testing tea revisited. Journal of Sensory Studies 3(2); 1988; 151-158

The British Standards Institution and the International Standards Organization specify that when mixtures of tea and milk are to be evaluated sensorially, the tea should be added to the milk. Four cups of tea prepared by pouring the tea into the cup first (TIF) and four cups prepared by placing the milk in the cup first (MIF) were presented to 155 panelists in the dark. They were instructed to select by taste the four cups containing the MIF tea. The frequency of correct selection was well above the chance level, indicating that the panelists had detected a difference in flavour. The same task was performed by 131 panelists except they evaluated the tea in light. The panelists were not highly trained tea tasters; in fact, most were not regular drinkers of hot tea. Notwithstanding that, their discriminating power was sufficient to resolve the subtle differences which did exist. AS

FATS AND OILS

Fats

Fatty acids

1568 Shimizu (S), Akimoto (K), Kawashima (H), Shinmen (Y) and Yamada (H). Production of dihomo-Gamma-linolenic acid by Mortierella alpina 1S-4. Journal of the American Oil Chemists" Society 66(2); 1989; 237-241

The mycellial dihomo-Gamma-linolenic acid content of an arachidonic acid producing fungus was found to increase with an accompanying marked decrease in its arachidonic acid content on cultivation of sesame oil. The resultant mycelia were found to be a rich source of dihomo-Gamma-linolenic acid. Studies carried out to optimise the culture conditions are described. MNK

Oils

1569 De Clemente (IM), Valletrisco (M) and Niola (I). Stability of edible oils to heating by HPLC. Industrie Alimentari 27(260); 1988; 439-441 (It).

The suitability of HPLC as a method to test the stability of edible oils to heating is confirmed. In fact by HPLC the fatty acids oxidation and the time in which substantial changes in the oils don't occur can be studied. AS

1570 Hsu (N), Diosady (LL) and Rubin (LJ). Catalytic behaviour of palladium in the hydrogenation of edible oils. II. Geometrical and positional isomerization characteristics. Journal of the American Oil Chemists" Society 66(2); 1989; 232-236

The geometrical isomerization characteristics of 5% Pd/alumina were investigated using response surface methodology. From the response surface, it was observed as expected that more trans isomers were formed at lower pressures and higher temp. A doubling of the metal concn. from 50 to 100 p.p.m. resulted in a small increase in isomerization in soybean oil, while for canola oil the same increase had a larger effect, especially at lower pressures. Similarly, an increase in temp. increases geometrical isomerization, especially at lower pressures, but the effect is more pronounced for canola than for soybean oil. Positional isomers were determined by oxidative ozonolysis in boran fluid MeOH and subsequent GLC analysis. Higher pressures suppressed positional isomerization. The effect of various catalyst supports on positional isomerization was also investigated. AS

1571 Martinenghi (GB) and Gamba (P). New proposals to prevent the pollution risk in the oil and fat industries. Industrie Alimentari 27(261); 1988; 546-550 (It).

A survey on the pollution and waste in the oil and fat industries, underlines the opportunity of new proposals for an efficient resolution of these problems, chiefly in the refining and distillation section. AS

1572 Nilsson-Johnsson (L), Brimberg (U) and Haraldsson (G). Experience of prerefining of vegetable oils with acids. FAT Science and Technology 90(11); 1988; 447-451

A general procedure for pre-refining of vegetable oils has been developed. This has been named as special degumming. Soybean oil, rapeseed oil and linseed oil have successfully been refined using the above procedure. N

Melon seed oils

1573 Achiefe (EC) and Ibemesi (JA). Applicability of the Freundlich and Langmuir adsorption isotherms in the bleaching of rubber and melon seed oils. Journal of the American Oil Chemists" Society 66(2); 1989; 247-252

The applicability of Freundlich and Langmuir adsorption isotherms to guide bleaching of vegetable oils was examined using rubber (Hevea brasiliensis (Wilid, ex Adr. Juss) Muell. Arg.] and melon (Colocynthis vulgaris (Schrad)) seed oils at temp. of 30, 55 and 80 C. Fuller's earth, activated charcoal and a mixture thereof (1:1

ratio) were used as the decolorizing agents (adsorbents). The degree of bleaching was monitored spectrophotometrically. AS

Olive oils

1574 Bruneth (L), Daghetta (A), Fedeli (E), Kikic (I) and Zanderighi (L). Deacidification of olive oils by supercritical carbon dioxide. Journal of the American Oil Chemists" Society 66(2); 1989; 209-217

Extraction of free fatty acids (FFA) from olive oil was performed using supercritical carbon dioxide. The solubility data obtained show that carbon dioxide extracts fatty acids more selectively than triglycerides under specific conditions of temp. and pressure. The technique is suitable for the deacidification of olive oils with FFA less than 10%. MNK

Palm oils

1575 Aitzetmiller (K), Wessels (H) and Werner (G). Analytical characterization of palm oils and palm oil fraction by HPLC of triglycerides. FAT Science and Technology 90(11); 1988; 442-447 (De).

The increasing importance of palm oils and palm oil fractions in international trade makes it necessary to develop analytical criteria for the characterisation of these products. One problem is the correct identification of palm oleins, which are often difficult to distinguish from palm oils. These products frequently exhibit similar fatty acid by GLC and similar iodine values. The correct identification of palm stearins by GLC is comparatively more easy. Palm oleins and palm oils can be characterized by HPLC using conditions that permit not only the separation of triolein from less unsaturated triglycerides of the same carbon number, but also, at the same time, a separation of tripalmitin from triglycerides containing oleic acid. By establishing the peak area ratios for a number of selected triglycerides a clear differentiation between palm oils and palm oleins, as well as various other palm oil fractions and their mixtures is obtained. AS

1576 Nukpa (NN), Arowolo (TA) and Akpan (AJ). Quality of Nierian palm oil after bleaching with local treated clays. Journal of the American Oil Chemists" Society 66(2); 1989; 218-222

Use of local Nigerian clays for bleaching crude plam oil was investigated. The oil obtained was assessed for its quality to find out the relative performance of the clays. MNK

Sunflower oils

1577 Cash (GA), George (GA) and Bartley (JP). A chemiluminescence study of the oxidation of vegetable oils and model compounds and the effects of antioxidants. Journal of the Science of Food and Agriculture 43(3); 1988; 277-287

Chemiluminescence was used to study the course of oxidation of sunflower oil samples at a number of temp. between 70 and 121 C. The induction time was determined for each sample and used to estimate the shelf life of the oils at 25 C. In addition, chemiluminescence during oxidation in air on alumina at 80 C was used to study both sunflower oil and, as a model compound, methyl linoleate with and without added artifical antioxidants. By using the method of inhibitors, the reaction rate and level of hydrogenperoxide were determined. It was also possible to determine the level of naturally occurring antioxidant in the vegetable oil. AS

Yeasts

Candida curvata oils

1578 Leman (J), Bednarski (W), Tomasik (J) and Borejszo (Z). Production and composition of oil from Candida curvata D. Acta Alimentaria Polonica 13(1); 1987; 75-82

A strain of the yeast Candida curvata D. was cultured on deproteinized whey medium. The effect of temp. and acidity on oil biosynthesis, yield as well as on lactose utilization and reduction of chemical oxygen demand in the post-culture effluent was studied. The composition of the biomasses and of the oil was compared. AS

SPICES AND CONDIMENTS

Spices

1579 Dziezak (JD). Spices. Food Technology 43(1); 1989; 102-116

This article describes the history of spices, the major spice producing plants, spice blends, dehydrated vegetables and guidelines influencing flavour retention. GAR

Marjoram

1580 Fischer (N), Nitz (S) and Drawert (F). Original composition of marjoram flavour and its changes during processing. Journal of Agricultural and Food Chemistry 36(5); 1988; 996-1003

The comp. of monoterpenes in essential oils or flavour extracts from marjoram (Majorana hortensis Moench) depends on the method applied for their isolation. Experiments with solvent extracts, with leaf material ground under liquid nitrogen, and with direct injections of the content of oil glands revealed the presence of a common precursor structure. The study of rearrangement reactions of sabinene hydrate and sabinene hydrate acetate confirmed that the sabinene hydrate skeleton represents the primary monoterpene structure in marjoram. Two activated forms are responsible for the formation of rearranged monoterpenes during workup of the plant material: a "bound" form, presumably (Z)-sabinene hydrate pyrophosphate, and a "free" form, (Z)-sabinene hydrate acetate, which is the main component in the oil glands together with (Z)-sabinene hydrate. AS

Peppers

581 Ekundayo (O), Laakso (I), Adegbola (R-M), Oguntimein (B), Sofowora (A) and Hiltunen (R). Essential oil constituents of Ashanti pepper (Piper guineense) fruits (berries). Journal of Agricultural and Food Chemistry 36(5); 1988; 880-882

The composition of the volatile oil from the fruits (berries) of Ashanti pepper (Piper guineense) was investigated in detail by means of gas chromatography (GC) and gas chromatography-mass spectrometry techniques. The phenylpropanoid-rich essential oil was comprised of myristicin, sarisan, safrole, and elemicin as the dominant components. Fifty-one mono- sesquiterpenoids constituted a minor proportion of the oil. Considering the plants dietary and medicinal use in West Africa and given the relatively high concn. of benzodioxole derivatives, the potential toxicity of the volatile oil is briefly evaluated. AS

1582 Husain (S), Nagheswara Sarma (P) and Swamy (GYSK). Monitoring ethylene dibromide residue in Indian black pepper by gas liquid chromatography using electron capture detector. Indian Journal of Technology 26(8); 1988; 403-404

A method based on gas liquid chromatographic technique using electron capture detector has been developed to estimate the ethylene dibromide residues (levels tested 10-400 p.p.b.) in black pepper at p.p.b level. The recoveries of added EDB were between 98 and 103% by this method. The method is specific for pepper samples. KAR

Turmeric

1583 Rouseff (RL). High performance liquid chromatographic separation and spectral characterization of the pigments in turmeric and annatto. Journal of Food Science 53(6); 1988; 1823-1826

SENSORY EVALUATION

1584 Beausire (RLW), Norback (JP) and Maurer (AJ). Development of an acceptability constraint for a linear programming model in food formulation. Journal of Sensory Studies 3(2); 1988; 137-149

Control of a product's market acceptability can be a difficulty when using linear programming models in food formulation. The development of an acceptability constraint was demonstrated for a linear programming model used for the formulation of fresh turkey Bratwurst, a coarse ground type sausage. Development was in two stages. First, an experimental design and in-house panel determined quantitative relationships between the product's textural attributes and turkey meat ingredients. Second, the product toughness relationship was utilized to develop three formulations with different levels of toughness. These formulations were market tested using the acceptor set size as the measure of market acceptability. A relationship between product toughness and acceptor set size was determined, into which was substituted the toughness f (ingredients) relationship. This yielded acceptor set size as a f (ingredients) that was added to the least cost linear programming model in the form of an acceptability constraint. AS

1585 Francois (P) and Sauvageot (F). Comparison of the efficiency of pair, duo-trio and triangle tests. Journal of Sensory Studies 3(2); 1988; 81-94

The pair, duo-trio and triangle tests were compared, using three levels of instructions with orange drinks as medium and sucrose as stimulus. If the subjects know only the nature of the test, the pair test cannot be performed and the frequencies of correct responses above chance of the two other tests do not differ significantly, in this case the triangle test is the more efficient. If the subjects know the nature of the test and the nature of the stimulus, the frequency of correct responses above chance obtained for the pair test is significantly higher than those of the two other tests, in this case the pair test is more efficient. Finally, if the subject know the nature of the test, the nature of the stimulus and whether or not the sample to be selected contains the stimulus, the conclusions are more difficult to achieve but the triangle test seems to be the more efficient. AS

1586 Lundahl (DS) and McDaniel (MR). The panelist effect-fixed or random. Journal of Sensory Studies 3(2); 1988; 113-121

The theoretical and practical aspects of how panelists might be viewed are investigated. The situation where panelists are viewed as random selections (random effects) from a population of all possible panelists is compared to viewing panelists as the entire population of interest (fixed effects). The statistical implications of each view point are investigated. Sources of variations related to the panel, panelists and the testing environment are discussed. An arguments is presented concluding that in most situations panelists should be viewed as random effects. This allows results to be related to a larger population of prospective panelists. AS

1587 Martens (M), Rodbotten (M), Martens (H), Risvik (E) and Russwurm (HJr). Dissimilarities in cognition of flavour terms related to various sensory laboratories in a multivariate study. Journal of Sensory Studies 3(2); 1988; 123-135

A study of dissimilarities in cognitive perception of 20 common flavour terms was carried out by the Sensory Group of Norway. An average congnitive pattern of the flavour terms was revealed from multidimensional scaling (MDS) and cluster analysis (CLU). In general, small but interesting deviations between different sensory lab. working with various food products were found by a multivariate pattern recognition technique based on principal component analysis (PCA). Suggestions for finding general reference standards for flavour terms are discussed. AS

FOOD STORAGE

Nil

INFESTATION CONTROL AND PESTICIDES

Infestation control

1588 Samson (PR) and Parker (RJ). Relative potency of grain protectants on maize, paddy rice and wheat. Journal of Stored Products Research 25(1); 1989; 31-38

The biological activity of 10 grain protectants was compared on maize, paddy rice, and wheat at 25 C, 70% RH. The comparison of activity between pairs of grain sp. was expressed as a relative potency, a value of 1 indicating that the compound was equally effective on both grains. Freshly-applied deposits of five protectants tested against (Tribolium castaneum (Herbst) were more potent on maize than on paddy and wheat by 2.2-3.3 times and 1.1-3.0 times, resp. Freshly-applied deposits of six protectants tested against Rhyzopertha dominica (F.) were motly of equal potency on maize and paddy. On protectant, methacrifos, was less potent on maize or equally potent on both grains. The values for the relative potency of protectants on maize in comparison with wheat and particularly paddy were smaller when measured against R. dominica rather than T. castaneum, but use of Sitophilus oryzae (L). S. zeamais Motschulsky and Oryzaephilus surinamensis (L). as test insects gave relative potency values similar to those obtained using T. castaneum. All protectants were less active after treated grain had been stored for 3 months at 30 C. Loss of activity was greater on paddy than on maize, and so relative potencies on maize in comparison with paddy were larger than when measured immediately after application. Aged residues of all protectants were more potent on maize than on paddy against both T. castaneum and R. dominica. Relative potencies of aged residues on maize and wheat mostly remained the same as immediately after application; however, the relative potency of methacrifos against, R. dominica (maize/wheat) increased such that after 3 months storage it was equally potent on both grains. AS

Pesticides

1589 Stan (HJ) and Christall (B). Residue analysis of organophosphorus pesticides with capillary gas chromatography and flame photometric detection. Injection of large sample volumes using a combination of programmed temperature vapourizer and retention gap. Deutsche Lebensmittel-Rundschau 84(12); 1988; 375-381 (De).

BIOCHEMISTRY AND NUTRITION

Biochemistry

1590 Matoba (T), Kuchiba (M), Kimura (M) and Hasegawa (K). Thermal degradation of flavour enhancers, inosine, 5'monophospate, and guanosine 5'-monophosphate in aqueous solution. Journal of Food Science 53(4); 1988; 1156-1159, 1170

The mechanism of thermal degradation of inosine 5'-monophosphate (IMP) and guanosine (GMP) was investigated kinetically in aqueous solution as a function of pH and temp. The degradation of IMP and GMP followed first order kinetics. The rate constants were considerably affected by pH and temp. The half-life times at 100 C were: IMP, 8.7 h (pH 4.0), 13.1 h (pH 7.0), 46.2 h (pH 9.0); GMP, 6.4 h (pH 4.0), 8.2 h (pH 7.0), 38.5 h (pH 9.0). These times were shortened to about one-third by raising the temp. 10 C. The predominant degradation products were nucleosides and phosphoric acid, indicating that the main reaction of the thermal degradation was the hydrolysis of the phosphoric ester bond in the nucleotides. AS

Amino acids

1591 Adeola (O), Buchnah-Smith (JG) and Early (RJ). Gas and high performance liquid chromatographic analyses of amino acids in soybean meal, corn and triticale. Journal of Food Biochemistry 12(3); 1988; 171-181

Analyses of amino acids in six samples each of soybean meal, corn and triticale by HPLC and gas chromatography GC were compared. Samples were hydrolyzed in 6 N HCl, then phenylthiocarbamyl (for HPLC) and N-heptafluorobutyryl (for GC) derivatives of free amino acids were prepared and analyzed by the appropriate system. Coeff. of variation within each feedstuff for amino acids analyzed by HPLC ranged from 1.8 (leucine) to 23.5% (methionine) in soybean meal, 2.7(leucine) to 14.7% (methionine) in corn and 1.7 (leucine) to 14.3% (cystine) in triticale. Corresponding figures from GC analysis were 0.7 to 22.4%, 1.4 to 14.3% and 1.6 to 12.1%, resp. Linear regression of HPLC on GC values gave good fits with R^2 ranging from 0.86 for cystine and 0.99 for isoleucine, leucine, lysine, methionine, phenylalanine, threonine, alanine, aspartic acid and glycine. Although some differences between the two systems were evident, feedstuff amino acid values obtained HPLC and GC analyses compare very well. Results of this study and consideration of such factors as ease of derivatization and length of time for analysis, in our opinion, make HPLC the system of choice. AS

Tryptophan

1592 Friedman (M) and Cuq (JL). Chemistry, analysis, nutritional value, and toxicology of tryptophan in food. A review. Journal of Agricultural and Food Chemistry 36(5); 1988; 1079-1093

The complex transformations of tryptophan in foods and the great diversity of derivatives formed as well as possible antinutritional and toxic manifestations are reviewed. The stability of free or protein-bound tryptophan during processing and storage depends on temp. and the presence of oxygen or other oxidizing agents, especially lipid peroxides, and radiation. In the absence of oxidizing agents, tryptophan is stable amino acid, even in strongly basic or acidic conditions. Free or bound tryptophan is relatively stable during heat treatment such as industrial or home cooking in the presence of air or steam sterilization. Only severe treatments cause a significant degradation of this amino acid. In the presence of carbonyl compound or/and at high temp., however, carboline formation occurs. Both carbolines and tryptophan-derived nitroso compounds are potential carcinogens. Tryptophan losses during food processing cannot always be monitored because of the lack of reliable analytical methods. These considerations suggest research needs for better methodology to measure tryptophan in complex foods and for new ways to prevent the formation of tryptophan-derived antinutritional and potentially toxic compounds in foods. AS

Nutrition

1593 Cadden (A-M). Moisture sorption characteristics of several food fibers. Journal of Food Science 53(4); 1988; 1150-1155

Adsorption behaviour of microcrystalline cellulose, guar gum, wheat bran and oat bran were compared at 4, 25, and 37 C. Guar gum adsorbed the most water and microcrystalline cellulose adsorbed the least. Adsorption abilities of oat bran and wheat bran were similar at low and intermediate water activity levels. However, wheat bran was able to adsorb more moisture in the high water activity regions of the isotherm. Of the four fibers studied, particle size reduction and the greatest effect on sorption properties of wheat bran, in part, due to the reduction of surface area available for binding at the monolayer. AS

1594 Godavari Kamalanathan, Premakumari (S), Geetha (G), Udayakumari (S) and Sara Thomas (S). An evaluation of the suggested balanced diets of the ICMR (1981) for women doing moderate and heavy work. Indian Journal of Nutrition and Dietetics 24(12); 1987; 362-369

This study was planned to evaluate the working of the suggested pattern of food allowances suggested by ICMR (1981) for adult women doing moderate and heavy work including the expectant and nursing mothers involved in moderate and heavy work. The menu was prepared and fed over 3 days period. In general it was seen that in the consumption pattern of the subjects, deficit intake of cereals and milk products was noticed and at the same time subjects doing heavy work could consume twice the quantity of leafy vegetables resulting in double the consumption of vitamin C and beta-carotene. It was concluded that ICMR suggested patterns of diets are found applicable for adult women in this region except for the requirement of riboflavin which can be overcome with judicious selection of foods. KAR

1595 Narayan Prasad (N) and Viswanathan (KR). Protein quality of a processed and stored military ration. Indian Journal of Nutrition and Dietetics 25(3); 1988; 87-93

In this study a military ration comprising chapathi, stuffed parotta and potato peas curry after storage under ambient conditions for 6 months was evaluated for its protein quality by the standard method of biological value. It has been seen that the observed 5% lower digestibility of the military ration has been attributed to its apparent high fibre content (7.1%). Although it has a low biological value (74) compared to that of a standard (casein) protein it has been found to be reasonably a good source of protein, (7.79%) suitable for military personnel for short term consumption. As the ration is consumed only for short periods in place of fresh rations it is not found to have any likely adverse effect on the nutritional status of the consumer. NGKR

1596 Southon (S), Wright (AJA), Price (KR), Fairweather-Tait (SJ) and Fenwick (GR). The effect of three types of saponin on iron and zinc absorption from a single meal in the rat. British Journal of Nutrition 59(3); 1988; 389-396

Iron and zinc retentions in young male rats, given 3 g starch-sucrose paste containing 120 µg Fe as ferrous sulphate or 139 µg Zn as zinc chloride extrinsically labelled with 59^{Fe} or 65^{Zn} and increasing amount Gypsophila saponins, were measured by whole-body counting. The results were compared with whole-body Fe and Zn retention from a meal containing crude or purified saponin fractions. In a separate exp. Fe retention from a meal containing Gypsophila saponins, soyasaponin I, saponins extracted from lucerne (Medicago sativa) plant tops, was measured in older rats. Results indicated that Fe absorption decreased with increasing concn. of Gypsophila saponins. This was significant at a saponin: Fe molar value of approx. 1, with max. effect occurring at molar ratios of 4 and above, when Fe absorption was reduced by approx. 17%. Gyposphila saponins had no effect on Zn absorption from a test meal. Fe absorption was similar in groups given purified or crude Gypsophila saponins at the same saponin:mineral molar value of 8, demonstrating that the non-saponin' fraction of the commercial preparation does not affect the absorption of this mineral. Saponins extracted from lucerne plant tops, fed at a saponin Fe value of approx. 8, also reduced Fe absorption from a single meal. Fe absorption from a meal containing a similar amount of soyasaponin I was not significantly different from controls. These results indicate that some dietary saponin may reduce Fe absorption and hence have an adverse effect of Fe status in man and simple-stomached animals. AS

TOXICOLOGY

Fungi

Penicillium

1597 Mutti (P), Previdi (MP), quintavalla (S) and Spotti (E). Toxigenicity of mould strains isolated from salami as a function of culture medium. Industria Conserve 63(2); 1988; 142-145 (It).

About 40 mould strains were isolated from commercial Italian-type salami and identified 68% of the isolates were found to belong to the genus Penicillium, the remaining 32% to the genus Aspergillus. The potentially toxigenic sp. (39% of the isolates) were then tested for their ability to produce the most important mycotoxins at 25 C in two different synthetic media (MTB and NB). In MTB, all strains identified as A. ochraceus produced penicillic acid (from 100 to 840 mg/kg), while only one of them produced ochratoxin A. The strain identified as A. parasiticus proved to be the only aflatoxin-producing sp. (215 mg/kg of total aflatoxins in 14 days in MTB). Neither the A. ochraceus strains nor the A. parasiticus one produced mycotoxins in NB medium. The moulds belonging to the genus Penicillium were unable to produce, in both media, the mycotoxins researched. AS

FOOD LAWS AND REGULATIONS

1598 Sen Gupta (P). Food laws of the country and consumers participation. Indian Food Packer 42(6); 1988; 38-41

Nature of adulterants in food and the preventive measures taken by Government by way of enforcing the Food Adulteration Act and the duties and responsibilities of the consumers are dealt in the article. KAR

SPICES

(1987 - 1988)

A Bibliography

The National Information Centre for Food Science and Technology, CFTRI, Mysore has just compiled a bibliography on Spices covering the period 1987-1988. The bibliography lists 508 titles. Price Rs.50/- + postage. Copies can be had from The Area Coordinator, FOSTIS, CFTRI, Mysore - 570 013. The Demand Draft should be drawn in favour of "Director, CFTRI, Mysore".

GENERAL

1599 Bhalerao (SD), Mulmuley (GV), Ananthakrishna (SM) and Potty (VH). Waste and wastewater management in food industry. I. Fruit and vegetable processing. Indian Food Packer 43(2); 1989; 5-20

The type of solid wastes available from fruit and vegetable processing plants including those of citrus, mango, pineapple, apple, tomato and potato; sources and proportion of waste water effluent coming out of fruit processing plant, pretreatment needed for these effluents before discharging them into a public swere/land application system/irrigation, etc. and recovery of by-products from fruit and vegetable industrial wastes are the aspects covered. KAR.

1600 Takitani (S) and Suzuki (M). Recent advances in food analysis (3). Journal of Japanese Society of Food Science and Technology '(Nippon Shokuhin Kogyo Gakkaishi') 35(12); 1988; 875-881 (Ja).

1601 Zamorani (A) and Spettoli (P). Technology and quality treatments of foods. Industrie Alimentari 27(263); 1988; 721-724, 728 (It).

Due to the continous changes of living standards in modern society, the definition of food quality evolves in time. It is actually conditioned by the need to use stored foodstuffs and by chemical processing of agricultural products, environmental pollution and food technologies. The aim of food industries is to give to the consumers a hygienic, preservable, genuine food product. In order to be hygienic and durable, a food needs to undergo different treatments which consequently would make it less genuine. Therefore the concept, natural genuine quality, must be changed to legal genuine quality. Even though there is a broad var. of food on the market, there are five main preserving methods, high temp., process, low temp. storage, water activity lowering, fermentation process and use of chemical additives. The introduction of a new term typical quality, should be considered to indicate the area of commodities production and the applied technologies. AS

FOOD PROCESSING

1602 Yano (T) and Maekaji (K). Study on the development of process controller for food steamer. Journal of Japanese Society of Food Science and Technology '(Nippon Shokuhin Kogyo Gakkaishi') 35(12); 1988; 860-865

A process controller for automatic operation of food steamer was developed. It consisted of a microcomputer, interfaces, and software including subroutine programs. Performance of the controller was tested by the use of a Kamaboko (a fish meat gel) steamer made on experimental basis. Almost all the temp. measured in the steam box were found within the range of 88 - 92 C, when the controller was set to maintain at 90 C by means of the fuel gas control of boiler. The results demonstrated that the controller developed was useful in practice. AS

FOOD PACKAGING

1603 Tsaka (T), Steiner (I), Washuttl (J) and Kroyer (G). De-germination of plastic food packing foils through microwave treatment. Deutsche Lebensmittel-Rundschau 85(1); 1989; 14-16 (De).

In this paper the effect of microwave treatment of Bacillus subtilis, Escherichia coli and Yarrowia lipolytica during sterilisation of plastic foils made from polyterephthalates is discussed. The foils prepared with these specified microorganisms were treated with microwaves of 2450 MHz and a power output of 650 W between one and ten minutes. Spores of Bacillus subtilis were killed completely after 8 min whereas 99.6% of Escherichia coli could be destroyed after 8 min (a longer treatment with microwaves was not applicable because the foils began to melt). Yarrowia lipolytica was very sensitive to microwaves: it was completely destroyed after 3 min. Therefore it seems obvious that microwave treatment is not the proper method for complete sterilisation of plastic foils not sensitive to heat; but it is applicable for a reduction of microorganisms on packaging materials lower than 100%. AS

FOOD ENGINEERING AND EQUIPMENT

Engineering

1604 Chandarana (DI) and Gavin III (A). Establishing thermal processes for heterogeneous foods to be processed aseptically. A theoritical comparison of process development methods. Journal of Food Science 54(1); 1989; 198-204

A mathematical model for predicting heat transfer into particulate foods processed in a continuous aseptic system was developed. Various approaches were taken to theoretically design thermal processes for a commercially sterile model product. The impact of the thermal treatment on possible nutrient retention and on accumulated microbial effectiveness was assessed. Comparison of the approaches presented indicated that neglecting the thermal contribution of a heat exchanger while scheduling the thermal process for a particle center F_O of 6.0 min could result in an effective F_O of as high as 78 min. In addition, such a conservative approach can result in higher nutrient destruction, 13.6% to 18.6%, instead of 6% to 17% depending on particle size. AS

1605 McGuire (J) and Kirtley (SA). On surface characterization of materials targeted for food contant. Journal of Food Science 54(1); 1989; 224-226

A measurable parameter related to solid surface energy has recently been suggested to provide an index of contact material interactability with components of fluid food. Employing contact angle methods, two series of aqueous solutions were used to evaluate this parameter for a var. of food contact surfaces. Results were independent of which series of diagnostic liquid was used. This supports the identity of the parameter as a true surface property, unique for a given material, and related to the polar character of its surface. Direction is provided toward a means for contact surface characterization which may aid the development and use of models describing food particle behaviour at interfaces. AS

1606 Sastry (SK), Shen (GQ) and Blaisdell (JL). Effect of ultrasonic vibration on fluid-to-particle convective heat transfer coefficients. Journal of Food Science 54(1); 1989; 229-230

Studies were conducted to determine the potential of ultrasonic energy as a heat transfer enhancing agent in sterilization applications. Metal transducer particles were immersed in warm liquids with and without sonic agitation, and temp. histories were recorded. Convective heat transfer coeff. were calculated from the solution to the lumped convective heat transfer equation. Results indicate that fluid-to-particle heat transfer was significantly enhanced by the use of sonic energy, and that within the range of variables investigated, the amount of enhancement was dependent more on natural convection and standing wave patterns than particle size and energy input per unit mass. AS

1607 Zeehman (LG) and Pflug (IJ). Location of slowest heating zone for natural-convection-heating fluids in metal containers. Journal of Food Science 54(1); 1989; 205-209

Studies were conducted to locate the slowest heating zone (SHZ) along the vertical axis of vertically positioned containers for 16 liquids of different physical properties in 211 x 400 metal containers and for water in 13 sizes of metal container, and to assess significance of the findings for the design of thermal processes. For conditions tested, SHZ was found near the container bottom. The SHZ for natural convection-heating products is usually located no higher than 25% of the container height above the container bottom. The SHZ's location is most critical in thermal process design for liquids of high initial viscosity in small containers where there is a large difference in temp between heating medium and SHZ at the end of heating. AS

Drying

1608 Urbicain (MJ) and Rotsteir (E). Effective thermal conductivity of cellular tissues during drying. Prediction by a computer assisted model. Journal of Food Science 54(1); 1989; 194-197

Effective thermal conductivity, K, of cellular tissues during drying is predicted as a function of moisture content. A computer model based on a planar tessellation is employed to simulate the tissue. The heat conduction equations are written on the tessellation and solved by means of a finite element technique. The whole technique, implemented in a computer package THERCOND, yields upper and lower bounds for K which are compared to exp. values available for apples and pears. AS

Equipments

1609 Moore (CD). Direct steam cookers. Manufacturing Confectioner 68(11); 1988; 88-91

The advantages of Direct Steam Cookers in manufacture of jellies are briefly described. The accomplishment of pressure cooking can include: gelatinization and solubilizing of stabilizer, evaporation of moisture, sterilization, deaeration, continuous processing, interruptible quick production and uniformity of processing. SYR

1610 Moresi (M). Analysis of the design and controlling parameters of aerobic fermentation equipment. Industrie Alimentari 27(262); 1988; 617-626 (It).

In this work the main types of lab-. pilot- and industrial-scale aerobic fermentation equipment are reviewed and classified into three different groups according to the method used to promote turbulence and disperse the gas bubbles within the bulk of the culture broth, that is mechanically- pneumatically, or hydraulically-agitated fermenters. Then, the main geometric and operating variable necesary to define the process design of each type of fermentation unit are described. Finally, a synopsis of the bioparameters more suitable for controlling effectively the fermentation process during either the lab. and pilot plant R and D stages, or the industrial operation is reported. AS

1611 Weibel (R). Present-day trends in flour mill engineering. Indian Miller 19(4); 1989; 7-21

The article has been reviewed under three sections with specific examples -(i) machinery constructed to be environmentally acceptable, (ii) plants designed to operate efficiently and (iii) products produced to meet the needs of the market. Examples cited for (i) include smaller air vol., lower power requirement and less noise and no accidents. Examples for (ii) are higher level automation and indispensability of process monitoring and logging. Examples for (iii) include high nutritional value, excellent quality and attractive appearance. KAR

ENERGY IN FOOD PROCESSING

1612 Steele (RJ). Microwaves in the food industry. CSIRO Food Research Quarterly 47(4); 1987; 73-78

Discusses potential of microwave heating, microwave tempering, microwave drying, the Hi-Tec microwave dryer, an Australian development, microwave vacuum drying, microwave sterilization, problems the acceptance of microwave processing and future for microwave food processing. BV

FOOD CHEMISTRY AND ANALYSIS

Chemistry(Analytical)

1613 Djelveh (G), Gros (JB) and Bories (B). An improvement of the cell diffusion method for the rapid determination of diffusion constants in gels or foods. Journal of Food Science 54(1); 1989; 166-169

A diffusion cell was designed to study the apparent diffusion coeff. of solutes through foodstuffs. The mathematical model corresponding to the experimental setup did not assume quasi-steady state diffusion within the slice of food. It was used to obtain the effective diffusion coeff. of NaCl through 3% agar gels. The results were compared to those obtained by using two agar gel cylinders at different concn. The diffusion coeff. of Cl in gel at 25 C was obtained with at least the same precision ($D = 1.30 \times 10^{-9}$ m^2 sec, $S_D = 0.03 \times 10^{-9}$ m^2 sec) within less than 110 min compared to a few h with the two cylinder technique. With the mathematical model used to determine diffusion coeff., the equilibrium ratio between solute concn. in solution and at the interface of foodstuff can be determined. AS

1614 Schaertel (BJ) and Firstenberg-Eden (R). Biosensors in the food industry. Present and future. Journal of Food Protection 51(10); 1988; 811-820

The following aspects of biosensors will be discussed; definitions and the evolution of various types of sensors; requirments for the food industry; currently available biosensors and their applications; advantages offered by and future uses of biosensors; and some problems in their commercial development. BV

FOOD MICROBIOLOGY AND HYGIENE

Microorganisms

1615 Mislivec (PB) and Bruce (UR). The use of sodium chloride for determining viable mold counts and mold flora in foods. Journal of Food

Protection 51(10); 1988; 770-772

The incorporation of 7.5% NaCl into potato dextrose agar (PDA), a medium routinely used for determining viable mold counts in foods, was effective in inhibiting fast-growing "spreader" molds. Viable mold counts using PDA with and without 7.5% NaCl were determined for 361 test samples of 12 food types, including dry, fleshy and frozen fleshy products. Only PDA plus 7.5% NaCl effectively inhibited the spreaders; food type did not influence its effectiveness. Average viable mold counts were usually higher for the 12 food types on PDA containing NaCl. With few exceptions, NaCl did not inhibit nonspreaders; in some cases it enhanced detection of more sp., including several mycotoxin producers. AS

Bacteria

Bacillus

1616 Pendukar (SH) and Kulkarni (PR). Chemical composition of Bacillus spores. Nahrung 32(10); 1988; 1003-1004

The basis of heat resistance of bacterial spores has remained an intruding problem. The large increase in the heat resistance from the vegetative to the spore state has been attributed to some extent to the differences in the chemical comp. of the vegetative cell and spore. However, not much data are available on the levels of important chemical constituents of spores of different sp. of Bacillus. The present work was therefore undertaken to study 5 of the Bacilli commonly encountered in food spoilage and food poisoning in this respect. AS

Bacillus stearothermophilus

1617 Henderson (WE) and Teague (WM). A kinetic model of Bacillus stearothermophilus $Alpha$-amylase under process conditions. Starch/Starke 40(11); 1988; 412-418

A model is presented describing starch hydrolysis by Bacillus stearothermophilus Alpha-amylase at temp. of 90 to 115 C and substrate concn. of 24 to 36% solids. First order kinetics adequately describe both enzyme decay and starch hydrolysis reactions. Quantitation of temp., pH, added Ca and substrate concn. interactive effects on the first order rate constants is aided by applying standard statistical techniques of experimental design and data analysis. A method for determining residual $Alpha-amylase activity in liquefact based on the Phadebas dye release assay, and an osmometry method for determining degree of liquefact hydrolysis are described. Computer implementation of the model allows rapid graphical visualization as well as screening of ideas for improved starch hydrolysis processes. AS

Escherichia coli

1618 Weiss (LH) and Humber (J). Evaluation of a 24 h fluorogenic assay for the enumeration of Escherichia coli from foods. Journal of Food Protection 51(10); 1988; 766-769

A 24 h assay for the detection and enumeration of Escherichia coli in foods was evaluated. The procedure used 4-methylumbelliferyl-$Beta$-D-glucuronide (MUG) incorporated into trypticase soy agar (TSA) and violet red bile agar (VRBA). The procedure was evaluated using 106 different stock cultures, and 165 isolates from a var. of naturally contaminated foods. Samples were first surface plated on TSA-MUG, and allowed to incubate at room temp. for 1-2 h. Plates were then overlaid with VRBA-MUC and incubated at 35 C for 24 h. The TSA/VRBA-MUC assay was able to detect 94.1% of the E. coli cultures tested, and 95.8% of E. coli strains isolated from foods, giving false-negative rates of 5.9% and 4.2% resp. False positive were found with 2 of 31 Salmonella spp. isolates and 4 of 4 shigella spp. isolates from the culture collection. There were no false positives from food isolates. The TSA/VRBA-MUG assay was able to detect E. coli in six food samples that were not detected by our routine procedure. The visible fluorescent halo around each E. coli colony gave immediate confirmation, without the need for further tests. The TSA/VRBA-MUG assay provided an accurate, simple, inexpensive method for detection of E. coli, from a wide var. of food products. AS

Klebsiella pneumoniae

1619 Kawaguchi (K), Amana (T), Satomi (K), Yokoyama (M) and Kodota (H). Studies on an extracellular polysaccharide produced by bacteria isolated from river water. Bulletin of the Japanese Society of Scientific Fisheries ('Nihon Suisan Gakkai-shi') 54(10); 1988; 1817-1821 (Ja).

In order to find new thickening agents or emulsifiers which possess useful characteristics for food industries, microorganisms from soil and water were screened and a bacterial strains from Sumida river, Tokyo could produce a large amount of extracellular polysaccharide. The strain was identified as Klebsiella pneumoniae in confromity to Bergey's Manual of Systematic Bacteriology (1984). The polysaccharide (BS-1) produced by this bacterial strain showed higher viscosity than xanthan gum, carageenan and tragacanth gum. The viscosity of 1%(w/v) BS-1 at 20 C reached 7000 cps under the shear rate of 1/s and BS-1 was found to be a good emulsifier when emulsions of o/w = 3/7 were made using several emulisifier involving BS-1, and stored at room temp. it was observed after 3 days that BS-1 stabilized the emulsion at the concn. of 0.1% (w/v), and that the emulsion kept its creamy smoothness. SGB

Pediococcus pentosaceus

1620 Tetlow (AL) and Hoover (DG). Fermentation products from carbohydrate metabolism in Pediococcus pentosaceus -PC39. Journal of Food Protection 51(10); 1988; 804-806

Pediococcus pentosaceus PC39 was grown in batch culture on selected hexoses and pentoses. The spent culture medium was analyzed by high performance liquid chromatography. Neither hexose metabolism nor pentose metabolism resulted in end-product patterns normally predicted for this organism based on its traditional classification. In general, the total amount of by-products, particularly ethanol, was unexpectedly high. AS

Streptococcus faecium

1621 Quintavalla (S), Campanini (M) and Miglioli (L). Effect of heating rate on the heat resistance of Streptococcus faecium. Industria Conserve 63(3); 1988; 252-256

The heat resistance, measured at 65 C in a culture medium, of a Streptococcus faecium strain isolated from a pasteurized ham, greatly increased when the cells were heated at two constant rates (0.48 and 0.13 C C/min). The increase in heat resistance was inversely related to the heating rate and was affected by the initial cell number (N_0). For a suspension of 10^7 cells/ml, D_{65} values increased five times (D_{65} = 27.8 min) and eight times (D_{65} = 42.9 min) as much as that obtained when heating was virtually instantaneous (D_{65} = 5.4 min). D_{65} values for suspensions of 10^4 and 10^2 cells/ml, determined at the lower heating rate, were found to be 16 and 11 times higher (D_{65} = 134.2 and 125.7 min, resp.) than those obtained with instantaneous heating. These results may have implications in calculating minimum heat treatment for commercial sterility in foods (F_T). AS

Fungi

Mushrooms

1622 Ingebrigtsen (J), Kang (B) and Flurkey (WH). Tyrosinase activity and isoenzymes in developing mushrooms. Journal of Food Science 54(1); 1989; 128-131

Tyrosinase activities and isoenzymes were monitored in developing mushrooms from small pins to the mature stage. Catechol oxidase activity varied by dihydroxy-o-phenylalanine (dopa) oxidase and tyrosinase activities decreased during development. Latent dopa oxidase activity, detected by including sodium dodecyl sulphate in the assay, increased with development of the mushrooms. The electrophoretic profile of dopa oxidase isoenzymes indicated that three forms were present in each developmental stage and that the amount of these three forms decreased with maturation of the fruiting body. The use of phenolic adsorbents to prevent discolouration of crude extracts resulted in decreased enzyme activities and the loss of specific isoenzyme forms. AS

1623 Rai (RD) and Saxena (S). Biochemical changes during post-harvest storage of button mushroom (Agaricus bisporus). Current Science 58(9); 1989; 508-510

Button mushrooms (Agaricus bisporus) (3.5 plus or minus 0.2 cm cap diam.) were harvested, cleaned and packed (200 g) in 100-gauge thick and perforated (0.5% vent area) polyethylene bags and stored at 5 C and 85-90% RH, 10 C and 70-75% RH, and 15 C and 55-60% RH for 4 days. Total sugars and protein contents decreased more at 15 C than at lower temp. with a concomitant increase in activity of protease but free amino acids content did not increase significantly. Total phenol content decreased during storage and at higher temp. The polyphenol oxidase activity was almost double at 15 C than at 10 and 5 C. KAR

Yeasts

1624 Jacob (Z). Selective medium for the production of lipids by Rhodotorula gracilis CFR-1. Journal of Food Science and Technology, India 25(6); 1988; 373-374

Out of the four Rhodotorula sp. tested for their oleagenicity, R. gracilis CFR-1 was found to be a potential lipid producer. Using Enebo's medium as a reference, a selective medium (glucose 40, potassium nitrate, 0.285, yeast extract 1.5, heptahydrated magnesium sulphate, 0.4, dihydrated calcium chloride, 0.4, potassium dihydrophosphate 0.75 g/l. pH 5.0) was developed and it increased the oleagenicity of R. gracilis CFR-I to more than 65%. AS

Pichia stipitis

1625 Delbenes (JP), Moletta (R) and Navarro (JM). The ethanol tolerance of Pichia stipitis Y 7124 grown on a D-xylose, D-glucose and L-arabinose mixture. Journal of Fermentation Technology '(Hokko Kogaku Zasshi') 66(4); 1988; 417-422

The tolerance of Pichia stipitis Y 7124 to initial added ethanol was evaluated in anaerobic and microaerobic conditions, during the fermentation of a sugar mixture (D-glucose 20%, D-xylose 75%, L-arabinose 5%). The ethanol tolerance depends on the presence of oxygen. In microaerobiosis, the fermentative capacity of P. stipitis is not inhibited when the initial ethanol concn. does not exceed 20 g/l; in this added ethanol range, the strain produced ethanol with a yield up to 0.40 g/g and a specific rate of 0.1 g/g, h. An increase of the initial ethanol level decreases the rate of ethanol production by the ethanol yield appears to be less sensitive to ethanol inhibition. In anaerobiosis, max. fermentative performances are obtained in the zero initial ethanol culture. When initial ethanol increases, growth and ethanol production decline gradually. But P. stipitis produces ethanol at an initial ethanol level of 50 g/l, even though this totally inhibits the strain activity in microaerobiosis. AS

Saccharomyces cerevisiae

1626 Lingnert (H), Akesson (G) and Eriksson (CE). Antioxidative effect of superoxide dismutase from Saccharomyces cerevisiae in model systems. Journal of Agricultural and Food Chemistry 37(1); 1989; 23-28

1627 Soloshenko (VM), Sergeev (VA), Bezrukov (MG) and Titova (EF). Structure of protein solutions. Part 2. Solutions of total protein of yeast Saccharomyces cerevisiae. Nahrung 32(4); 1988; 311-318

Water systems formed by total protein of yeast Saccharomyces cerevisiae and model systems on the basis of unfractionated casein were studied by viscosimetry and electron microscopy. Methodologically, both methods offered a possibility of distinguishing several quantitatively different concn. intervals in protein solutions under different conditions. Viscosimetry gave the most informative results at the concn. intervals where the solutions approached the true ones, while electron microscopy did so when supermolecular formations prevailed. In comparing the data obtained by these two methods the following conclusions were drawn. At low temp. (4-10 C) yeast protein was in mol. dissociated condition. Association in the system starts at 10 C, and becomes enhanced with a rise in temp. A temp. rise to 25-30 C promotes a more compact packing of polypeptide chains; further heating leads to high-temp. denaturation. Lipids induce covering of polypeptide chains and prevent associations, thus leading to an increase in the system's thermostability. AS

Zymomonas mobilis

1628 Yanase (H), Kuric (J) and Tonomora (K). Fermentation of lactose by Zymomonas mobilis carrying a Lac$^+$ recombinant plasmid. Journal of Fermentation Technology '(Hokko Kogaku Zasshi') 66(4); 1988; 409-415

Lac+ recombinant plasmids encoding a $Beta$-galactosidase fused protein and lactose permease of Escherichia coli were introduced into Zymomonas mobilis. The fused protein was expressed with 450 to 5,860 Miller units of $Beta$-galactosidase activity, and functioned as lactase. Raffinose uptake by Z. mobilis CP4 was enhanced in the plasmid-carrying strain over the plasmid-free strain, suggesting that the lactose permease was functioning in the organism. Z. mobilis carrying the plasmid could produce ethanol from lactose and whey, but could not grow on lactose as the sole carbon source. It was found that the growth of the organism was inhibited by either galactose or the galactose liberated from lactose. AS

Hygiene

1629 Marin (V). Sterilization, disinfection and sanitization in food industries. Industrie Alimentari 27(263); 1988; 731-734 (It).

BIOTECHNOLOGY

Nil

TISSUE CULTURE

Nil

FOOD ADDITIVES

Antioxidants

1630 Kasuga (A), Aoyagi (Y) and Sugahara (T). Antioxidant activities of edible plants. Journal of Japanese Society of Food Science and Technology '(Nippon Shokuhin Kogyo Gakkaishi') 35(12); 1988; 828-834 (Ja).

Screening for antioxidative activity of 117 parts consisted of edible plants (107 kinds) were performed on their ethanol extract. About half of them showed some influence on oxidative stability of methyl linoleate. Especially 26 sp. of them seemed to have rather strong antioxidative activity. Selected 14 samples of the active plants were further examined on the activities of their ether, ethanol and water extracts to linoleic acid, resp., in emulsion system. The active components of the each sample showed individual and different behaviours to the solvent extractions. On the other hand, the contents of Alpha-, $Beta$-, $Gamma$- and $Delta$-tocopherol were determined by HPLC to clarify the active component of the antioxidative effects. Tocopherol seemed to contribute some role in the antioxidant activities of the several plants, but most of them suggested the presence of other effective substances. AS

Flavours

1631 Mosandl (A) and Gessner (M). Stereoisomeric flavour substances. XXIII. Lactone flavour compounds-structure and properties of the enantiomers. Zeitschrift fur Lebensmittel-Untersuchung und -Forschung 187(1); 1988; 40-44

Racemic mixtures of 5-hydroxyalkanoic acid-isopropylesters were converted into the diastereomers (5R), (5S)-[(R)-2-phenylpropionyloxy]-alkanoic acid-isopropylesters (11.11'-16.16') and (5R), (5S)-[(S)- Tetrahydro-5-oxo- furancarbonyloxyl]- alkanoic acid-isopropylesters (22.22'-26.26'), resp. These were then separated by liquid chromatography. The absolute configurations of 11-16 and 11' 16' were derived from H-NMR studies and the optical activity of the lactones, 1-6 and 1'-6' could be estimated after hydrolysis and recyclization. The optically pure stereoisomers of 2-6, 2'- 6' have been obtained from 22-26 and 22'- 26' on a preparative scale. The sensoric characteristics of the optically pure $Delta$-lactones are given. AS

Stabilizers

Gums

1632 Ohno (F), Suzuki (S), Maruyama (T) and Nishinari (K). Studies on chewing gum base made from tannic acid and gelatin. Journal of Japanese Society of Food Science and Technology '(Nippon Shokuhin Kogyo Gakkaishi') 35(12); 1988; 835-842 (Ja).

A mixture of tannic acid and gelatin was designed for use as a chewing gum base. The mixture was a chewable material like chewing gum on the market. The characteristics of the mixture were found as follows. (1) The mixture formed chewing gum by applying repeating press and folding regularly in water. (2) During the above operation, the mixture absorbed water at first, some parts of tannic acid and gelatin were released from the mixture and the remains formed chewing gum. (3) when the ratio of tannic acid to gelatin was lower than 0.2, the mixture did not form chewing gum but melted in water. When the ratio was near 0.5, the mixture formed bubble gum. (4) The mixture containing much water was soft, but formed a tight chewing gum after the operation. (5) The mixture made from acid-processed gelatin formed chewing gum in a wider range of pH than the mixture made from alkali-processed gelatin. AS

1633 Xili (L), Eryi (X), Gencheng (X), Reiming (S), Yuengming (W), Jie (C) and Fengchi (H). Safety evaluation studies of SGF gum. A potential food additive from the seed of Sesbania cannabina. Food and Chemical Toxicology 26(11/12); 1988; 935-946

SGF gum, derived from the plant Sesbania cannabina, has properties very similar to those of guar gum. Because it is much cheaper than guar, SGF gum is of interest as a possible new food additive. It has therefore been tested in rats for acute, short-term and subchronic toxicity, teratogenicity and effects on reproductive performance, and a 1% concn. in the diet has been identified as the no-effect level. The tests complied with the guidelines issued by the Chinese authorities. Mutagenicity studies, Ames tests and a micronucleus test gave negative results, and a dominant lethal test in mice was negative at the 1% dietary level, although at 5 and 10% the results were equivocal. No adverse changes were elicited in 23 human volunteers who consumed at total of 960 mg SGF gum during a 30-day period during which they consumed, daily , 80 g ice-cream containing 0.04% SGF gum instead of the usual thickener. On the basis of applying a 100-fold safety factor to the findings in the animal studies, an acceptable human daily intake of 6 mg/kg is suggested. AS

Pectin

1634 May (CD). Pectin-The additive from fruit. 1. Origins and properties. Food Trade Review 58(8); 1988; 438-441

Sweeteners

Cyclamates

1635 Schwedt (G) and Hauck (M). Novel HPLC procedure for cyclamate in food with precolumn derivatization. Zeitschrift fur Lebensmittel-Untersuchung und -Forschung 187(2); 1988; 127-129

A high-pressure liquid chromatography (HPLC) procedure for the detection of cyclamate in liquid and solid samples is presented, which depends on oxidation and the reaction ond cyclohexylamine with o-phthaldialdehyde to form a condensation product. The results of the HPLC analysis, using an RP-C 18 separation system with UV detection at 242 nm are reported. Contents, from 2 to 400 mg/l, can be detected in less than 2 h (HPLC analysis within 20 min) with relative standard deviations of 4%. Only for cucumber infusions were incomplete recoveries of 68% obtained. AS

Saccharin

1636 Kimmich (GA), Randles (J) and Anderson (RL). Inhibition of the serosal sugar carrier in isolated intestinal epithelial cells by saccharin. Food and Chemical Toxicology 26(11/12); 1988; 927-934

It was earlier suggested that sodium saccharin might inhibit intestinal sugar transport by the intestinal epithelial cells. In order to evaluate this idea the effect of sodium saccharin on sugar transport by isolated intestinal epithelial cells was examined. Results show that sodium saccharin (25-130 mM) had little if any. Direct active transport system, but the passive transport system was inhibitor by saccharin. KAR

Sodium saccharin

1637 Anderson (RL), Lefetver (FR) and Maurer (JK). Comparison of the responses of male rats to dietary sodium saccharin exposure initiated during nursing with responses to exposure initiated at weaning. Food and Chemical Toxicology 26(11/12); 1988; 899-907

The critical responses in pups exposed to a bladder tumorigenic dose of sodium saccharin during nursing are compared with those in pups exposed to the same dose initiated at weaning in order to determine the role of exposure during the susceptible period to bladder responses later in life. It was concluded that the effects on urinary parameters and the bladders exposed to sodium saccharin during suckling and weaning may be secondary to the effects of the same on the gastro-intestinal track. KAR

CEREALS

1638 Blakeman (JP), McCracken (AR) and Seaby (DA). Changes brought about in solid substrates after fermentations of mixtures of cereals and pulses with Rhizopus oryzae. Journal of the Science of Food and Agriculture 45(2); 1988; 109-118

Fermentations of Rhizopus oryzae using a mixture of soy grits and rye flakes resulted in increases in protein content of up to 36% over a 96-h incubation period. Increases in oil and nucleic acid were also recorded. The increase in protein content was largely explained by a decrease in dry wt. of the fermented material. Increasing aeration in petri dishes used for fermentation did not affect protein content or wt. loss. pH changes in fermented substrates were related to the nature of the ingredients used. A marked reduction in pH occurred when cereals were fermented. Three different methods for assessment of biomass in solid substrates are compared. AS

1639 Gupta (NK). The dust explosion risk in flour mills. Indian Miller 19(5); 1989; 43, 45, 48

The dust in flour mills consists chiefly of fine particles rubbed off the kernels and they cause explosion under condition of a suitable mixture of dust, air, a spark and confined area. The limit of dust concn. in the air for causing explosion, particle size and shape of dust, source of ignition of dust clouds, and prevention of dust explosions and safety methods are the aspects covered. KAR

1640 Olaofe (O). Mineral contents of Nigerian grains and baby foods. Journal of the Science of Food and Agriculture 45(2); 1988; 191-194

Maize (Zea mays), sorghum (Sorghum vulgare), cowpea (Vigna unguiculata Walp) and soy beans (Glycine max) of Nigeria were assessed for their suitability in preparation of baby foods by comparing their content of a range of minerals with that of a number of imported baby foods. The Fe content of the baby foods ranged between 57 and 82 ug g^{-1}, which was similar to the range in the foodstuffs, 49 to 201/ug g^{-1}. Ca, however, was much lower in the foodstuffs, 22-1300 compared with the baby foods, 4100-8600 ug g^{-1}. BV

1641 Van Rillaer (WG), Beernaert (H) and Dejonckheere (W). Determination of fumigants in cereals and cereal products by capillary gas chromatography. Zeitschrift fur Lebensmittel-Untersuchung und -Forschung 187(2); 1988; 97-101

This study describes two methods for the quantitative detn. of the residual fumigants ethylene dichloride (EDC), carbon tetrachloride, trichlorethylene (TCE), ethylene dibromide (EDB) and tetrachlorethylene (PCE) in cereals (especially wheat) and other foodstuffs. In the first method, a micro steam distillation-solvent extraction apparatus is used, while the second method is based on a headspace technique. For the quantitative detn. of carbon tetrachloride in cereals, the multiple headspace technique is not retained because it is too time-consuming. The analysis of the different fumigants is performed by electron-capture gas chromatography, using a fused silica capillary column. CP sil 8 CB. With the steam distillation-solvent extraction method, recoveries from 95.9% to 100.5% are obtained for the fumigants, added at two different levels. The standard deviation varies between 1.1% and 6%. Using the simple headspace technique, recoveries from 73.5% to 85.1% with a standard deviation of between 1.7% and 6.6% have been reached for the fumigatns in cereals fortified at two different levels. The absolute detection limits for the five fumigants EDC, carbon tetrachloride, TCE, EDB and PCE, in both methods, are 30, 0.25, 1.1, and 0.5 pg, resp. AS

1642 Wieser (H), Seilmeier (W) and Belitz (H (-D). Comparative investigations of partial amino acid sequences of prolamins and glutelins from cereals. VIII. Amino acid sequences of glutelin peptides. Zeitschrift fur Lebensmittel-Untersuchung und -Forschung 187(1); 1988; 27-34

The peptide fractions isolated from chymotryptic hydrolysates of wheat, rye and barley glutelins were separated by high-performance liquid chromatography on octadecyl silica gel. The peptides obtained were analysed for their amino acid comp. and some also for their amino acid sequence. Characteristic sequences of peptides from wheat glutelin can be grouped into three types. The first type contains a high amount of Gly and frequently Tyr in the N-terminal positions. A typical partial sequence, which occurs repeated in two peptides, is QGQQPGQGQ. Sequences of this type are found in high-mol. wt. subunits. The second type is characterized by the sequence SQ_n (n = 3-5) followed by a hydrophobic tripeptide e.g., PPF, PVL; the most frequent sequence is SQQQQPPF. Low-mol. wt. subunits contain sequence of this type. The third type, which has partial sequences such as QQPQQPFP, corresponds to typical peptides from prolamin. Most sequence of peptides from rye and barley glutelins can be divided into two groups. The predominant type shows prolamin-like sequences, e.g., PQQPXPQQ with X being F or I. The second type is similar to glycine-rich peptides from wheat glutelin, except that repeating sequences are less frequent. AS

Barley

1643 Mac Gregor (AW) and Dushnicky (L). $Alpha$-amylase in developing barley kernels a reappraisal. Journal of the Institute of Brewing 95(1); 1989; 29-33

The location of. Alpha-amylase in developing and germinating `Bonaza' and `Himalaya' cvs. of barley were studied. Fresh kernels from anthesis to maturity stages were fixed in glutaraldehyde, different tissues were dissected and used for assay fo Alpha-amylase activity and microscopic examination for Alpha-amylase after staining with suitable reagents. $Alpha$-amylase was located in the outer pericarp of developing barley. Only low PI Alpha-amylase i.e. Alpha-amylase 1, was detected in the pericarp in developing grain but only one of the two major low PI components of Alpha-amylase from germinated `Himalaya' was found in pericarp tissue. These enzymes appeared to hydrolyse the small starch granules (2-3/nM) present in the outer pericarp of developing barley kernel. The even smaller starch granules (< 2/nM) present in the inner pericarp were hydrolysed at a later stage of kernel development. NGM

1644 Wayman (M), Parekh (SR), Parekh (RS), Trass (O) and Gandolfi (E). Saccharification and fermentation of whole barley ground in the szego mill. Starch/Starke 40(11); 1988; 418-422

Barley, after steeping in water, was ground with ease and efficiency in the Szego mill, and its starch was liquefied, saccharified and fermented to very high yields of ethanol. The Szego mill consists of vertical rollers with helícal grooves which rotate within a fixed cylinder, resulting in very fine grinding and a somewhat flaky product. The steeped barley was ground to a fine paste. This was readily liquefied and saccharified by amylolytic enzymes (dual enzyme process), and the resulting sugars were fermented in 24 h by ordinary bakers, yeast Saccharomyces cerevisiae, resulting in over 450 l ethanol/t of barley. Still shorter time 12 h, and the same high yield were achieved when liquefied barley starch was simultaneously saccharified by glucoamylase and fermented. Fermentation to ethanol by a glucoamylase-producing yeast S. diastaticus strain 164 A (from Labatt Brewing Company) ėnable the amount of this enzyme required for saccharification to be reduced to about one-half the normal quantity, but at some cost in slower fermentation and slightly lower ethanol yield. AS

Buckwheat

1645 Amarowicz (R), Korczakowska (B) and Smoczynska (K). Effect of fiber from buckwheat on the in vitro enzymatic digestion of protein. Nahrung 32(10); 1988; 1005-1006

Nutritive value of buckwheat protein, compared to other cereals, is high. Special attention should be paid to a high level of lysine. Relatively low digestibility of buckwheat protein is most probably connected with a presence of fiber and tannin. In many in vitro studies, it was revealed that fiber changed the activity of digestive enzymes. The reason for it is, most probably, the contact between the enzyme and the substrate, being decreased due to the effect of fiber components and the electrostatic interaction between fiber and amphoteric particles of enzymes. During the experiments it was observed that purified fiber preparations give more distinct effect than fiber in natural form. It was also stated that the influence of the particular fiber components on the activity of the enzymes was diversified. The aim of the work was to examine in vitro how the buckwheat fiber affected the activity of digestive enzymes, pepsin, trypsin and chymotrypsin. AS

Rice

1646 Anand Prakash and Jagadiswari Rao. Use of radiant energy in post-harvest entomology of rice. Bulletin of Grain Technology 26(3); 1988; 238-243

1647 Griffin (VK) and Brooks (JR). Production and size distribution of rice maltodextrins hydrolyzed from milled rice flour using heat stable alpha-amylase. Journal of Food Science 54(1); 1989; 190-193

Maltodextrins were produced from milled rice flour in a single-step process using a heat-stable $Alpha$-amylase preparation. The starting solids content was 30% (w/w), and processing temp. and times were varied between 70-97 C and 15-75 min, resp. Optimum liquefied starch yields, which accounted for virtually all of the starch present, were obtained at temp. of 80 C and above, but reducing sugars and DE values were highest at 70 C. Low mol. wt. saccharide concn. (DP 1-10) were greatest at 80 C. Because processing at temp. of 90-97 C resulted in decreased levels of reducing sugars and DP 1-10 concn. without providing a substantial increase in solubilized starch yields, it was concluded that rice maltodextrins could be most effectively produced at a processing temp. of 80 C. AS

1648 Ratna Sudharkar (T), Sreeramamurthy (K) and Narayanarao (PV). Relative susceptibility of jowar varieties to rice weevil, Sitophilus oryzae Linn. Bulletin of Grain Technology 26(3); 1988; 208-213

Jowar (24 var.) were screened for their susceptibility to rice weevil (Sitophilus oryzae Linn) during storage under lab. conditions. None of the var. were found completely resistant although they could be grouped into moderately resistant, susceptible and highly susceptible var. Ash content and adult emergence among the insects was negatively correlated while positive correlation was found between developmental period of the weevil and ash content. P content of grain showed negative correlation with developmental period of the weevil. KAR

Rice bran

1649 Bera (MB) and Mukherjee (RK). Solubility, emulsifying and foaming properties of rice bran protein concentrates. Journal of Food Science 54(1); 1989; 142-145

Rice bran protein conc. were prepared from full-fat and defatted raw rice bran. Selected functional properties, viz. N solubility, emulsification properties, and foaming properties were measured over the pH range 2.0 to 10.5 and in three dispersion media including water, 0.1M NaCl (low salt) and 1.0 M NaCl (high salt). Below and above the isoelectric pH (4.5) the N solubility increased. Higher pH enhanced the N solubility, and, thereby, considerably improved the functional properties. In higher salt concn. N solubility was reduced which also altered the properties of emulsification and foaming. Multiple regression analysis showed that pH was the primary determinant of N solubility, emulsification and foaming properties. Multiple regression models including pH, salt concn. and N solubility as independent variable were found to be more accurate in predicting other functional properties. AS

1650 Tadera (K), Kaneko (T) and Yagi (F). Isolation and structural elucidation of three new pyridoxine-glycosides in rice bran. Journal of

Nutritional Science and Vitaminology 34(2); 1988; 167-177

Wheat

1651 Gill (KS) and Sekhon (KS). Production and prospects of durum wheat in India. Indian Miller 19(4); 1989; 54, 56, 58, 60, 62

Briefly reviews the developments in durum cultivation in India, diversification of durum cultivation to overcome Karnal bunt and lose smut diseases, common characteristics of durum wheats, and their quality and processing parameters including grain quality, comp., milling characteristics, and use of durum for pasta and baked product preparation. KAR

1652 Hanslas (VK) and Sangeeta Sikri). Choose superior wheat varieties for specific end-uses. Indian Miller 19(4); 1989; 41-49, 51-53

Milling characteristics of hard and soft wheats, strength (baking character) of wheats, bread quality and var. suitable for bread making; biscuit quality and the var. for biscuit making; properties needed for chapathi making and var. suitable for chapathi making are the aspects covered in this article. KAR

1653 Marsh (SJ), Annuk (D), Ozsarac (N) and Fox (DJ). Effect of weather damage on wheat enzymes. Journal of the Science of Food and Agriculture 45(2); 1988; 175-183

Sound (ungerminated) and germinated wheat kernals (cv Banks) were milled into wholemeal flours, and the activities of a range of enzymes important in baking were determined. Germination of the wheat gave increases in Alpha-amylase (EC 3.2.1.1) protease (azocaseinase), endo-arabinoxylanase (EC 3.2.1.55), endo-carboxymethylcellulase (EC 3.2.1.4) and Beta -D-glucopyranosidase (EC 3.2.1.21) activities, and a slight increase in activity was detected for Beta -D-xylopyranosidase (EC 3.2.1.37). $Beta$-amylase (EC 3.2.1.2) glutathione reductase (EC 1.6.2.4) and most of the glycosidase activities tested did not significantly increase on germination. AS

1654 Mohinder Singh. Effect of different levels of karnal bunt affected wheat grains on its marketing and chapathi making quality. Bulletin of Grain Technology 26(3); 1988; 224-227

Wheat (Cv C-306) grain and flour having karnal bunt contamination (caused by Neovossia indica) of -15.0% were evaluated for market price and human acceptability. Market price was significantly reduced when the wheat contained > 5% bunted grains and at 15% contamination the reduction in price was 41.2% for grain and 44.7% for wheat flour. The colour, texture, flavour and overall acceptability of the product decreased with the increase in contamination. The wheat flour produced from the grain having > 5% bunted grains was not acceptable to the consumers due to the bad colour and appearance. KAR

1655 Savitha Sharma, Nagi (HPS) and Sekhon (KS). Effect of blending laboratory sprouted grains on milling and baking properties of wheat.

Journal of Food Science and Technology, India 25(6); 1988; 330-334

Two commercial bread wheats (WL-711 and WL-1562) were germinated in the lab. for 24 h and 48 h and blended with sound ungerminated wheat in requisite proportions (0 to 100%) to see its effect on milling and baking properties. Sprouting did not alter the crude protein, ash and crude fat of grains. However, significant changes were observed in starch and total sugars. Blending of 1-2 day sprouted wheat upto 30% level did not produce any change in flour recoveries of the blends, rather yielded low ash flour. The flours from the blends (10-30%) had significantly lower protein and starch, with concomitant increase in free amino acids and sugars. Sprouting, its duration and blending increased amylolytic and proteolytic activities significantly. Damaged starch decreased in the 24 h sprouted flours whereas increased values were recorded with 48 h sprouting in both the cvs. Blending of 10-30% sprouted grains with sound wheat produced substantial improvement in loaf vol. of bread and cake but cookie spread was not affected with the blending. Upto 20% of 2-day sprouted wheat in the grist produced non-sticky doughs and chapathis puffed full. AS

1656 Seilmeier (W), Wieser (H) and Belitz (H-D). Reserved-phase high-performance liquid chromatography of reduced glutenins from different wheat varieties. Zeitschrift fur Lebensmittel-Untersuchung und -Forschung 187(2); 1988; 107-110

The reduced glutenins of 19 wheat var. having different baking properties were separated by high-performance liquid chromatography on a C silica gel column. The glutenin patterns consisting of about 20 peaks, varied significantly owing to the qualitative and quantitative differences. All chromatograms show the presence of three protein groups of different polarity, which correspond to subunits with middle, high, and low mol. wt. (MMW, HMW, and LMW subunits). The baking quality of the var. investigated is not dependent on the relative proportions of these three protein groups. However, there was distinct correlation with the HPLC pattern of the HMW group. AS

1657 Waghray (S) and Vaidehi (BK). Effect of humidity on Aspergillus flavus induced wheat seed deterioration. Bulletin of Grain Technology 26(3); 1988; 214-219

Wheat var. Sonalika was pretreated with Aspergillus flavus and stored at 75 and 85% RH for 90 days to find out the extent of deterioration and aflatoxin production. Treated seeds stored at 85% RH lost germination capacity after 45th day whereas those treated and stored at 75% had 6.6% germination after 90 days. Free fatty acids content increased faster and at higher rate (from 35 to 189.2%) in 85% RH stored (20.8 to 81.6%) and also in control seeds. Only aflatoxin B was produced in treated seeds stored at 85% RH and reached a peak level on 75th day (45 p.p.b.); but aflatoxin was not detected on 90th day. KAR.

1658 Werbeck (U) and Belitz (H-D). Partial reduction of wheat glutelin by mercaptoethanol and dithioerythritol. I. Investigations by gel permeation chromatography. Zeitschrift fur Lebensmittel-Untersuchung und -Forschung 187(1); 1988; 20-26

Glutenin, obtained from gluten by the extraction of gliadin with 70% aqueous ethanol, was reduced at pH 8 by increasing the concn. of mercaptoethanol (6-150 mmol/l) and using 35 mmol/l dithioerythritol. The reduced samples were separated (on Sephacryl S-400 with 0.7 mol/l acetic acid and 6 mol/l urea) into five to six fractions according to the different mol. wt. The peak maxima obtained were approx: (I) 2 x 10^6 (void vol.), (II) 2 x 10^5, (III) 9 x 10^4, (IV) 4 x 10^4, (Va) 2 x 10^4, (Vb) 10^4. The relative amount of protein in the different fractions depends greatly on the concn. of the reducing agent. The low-mol.-wt. fractions increase with increasing concn. In the unreduced state, 35% of the total soluble protein occurs in I and 14% in IV, but after complete reduction only approx. 5% are found in I and 52% in IV. The amino acid comp. in the fractions also changes significantly in the course of the stepwise reduction process. In the unreduced state, I and II correspond to whole glutenin and III and IV to the low-mol. wt. subunits resp. while in the completely reduced state, I and II have a comp. which is untypical for glutenin, while III corresponds to the high-mol. wt. and IV to the low-mol. wt. subunits. The comp. of V is, throughout, untypical of glutenin. AS

Wheat proteins

1659 Kahlon (TS) and Chow (FI). A comparison of methods for the intrinsic labelling of wheat protein with ^{35}5. Journal of Agricultural and Food Chemistry 37(1); 1989; 116-118

A hard red winter var. (Brule), grown to maturity in a green house, was intrinsically labeled with ^{35}5 by either stem injection or addition of the isotope to the medium in which detached wheat heads were grown. Two levels of isotope were applied by each method at 5, 10, 15 or 20 days postanthesis. Significantly higher ($P < 0.05$) yield (wt./head) or grain was observed with injection compared to the incubation method. Of the isotope introduced by injection, 77% translocated into the wheat kernel, and of this amount at least 77% of the isotope in the kernel was associated with kernel protein and free sulphur amino acids. Data suggest that injection of wheat stems 15 days after anthesis, with doses up to 10 MUCi of ^{35}5, would be a suitable method of obtaining intrinsically labeled wheat protein for bioavailability studies. AS

MILLETS

1660 Shambe (T), Voncir (N) and Gambo (E). Enzyme and acid hydrolysis of malted millet. (Pennisetum typhoidius) and sorghum (Sorghum bicolor). Journal of the Institute of Brewing 95(1); 1989; 13-16

Nigerian local var. of millet and sorghum were steeped for 13-19 h and germinated for 5 days. The malts were hydrolysed by in vitro by malt enzymes and the carbohydrates of the hydrolysed products were analysed, and compared with acid hydrolysed products. The carbohydrate comp. of enzyme hydrolysed malts was 65.3-77.7% manosaccharide, 10.8-14.9% disaccharide, 3.7-7.6% trisaccharides and 3.9-8.1% higher mol. wt. carbohydrates. Enzymic hydrolysis did not degrade hemicelluloses appreciably. Acid hydrolysis of unmalted and malted sorghum and millets hydrolysed hemicelluloses also and increased the samples carbohydrates of hydrolysed product. Malted samples were more susceptible for acid hydrolysis than unmashed samples. The amino acid profiles of unmalted and malted sorghum and millets are also given. NGM

Corn

1661 Caransa (A), Simell (M), Lehmussaari (A) and Vaara (M). A novel enzyme application for corn wet milling. Starch/Starke 40(11); 1988; 409-411

In corn wet milling the raw material is prepared by means of steeping. Steeping is required in order to obtain the valuable CSL (Corn steep Liquor), soften the kernel and break the cell walls Sulphur dioxide is added to the steepwater to inhibit bacterial growth. Depending on the type of corn, the steeping time in a semi-continuous steeping system varies from 36 to 60 h, which is substantially longer than all subsequent steps in the process. The corn comprises phytic acid, which to a large extent ends up in the CSL and constitutes an undesirable component. It has now been found that the problem caused by this phenomenon can be avoided by using phytic acid degrading enzymes during steeping. It has further been found, that by adding phytic acid degrading enzymes together with plant cell wall degrading enzymes to the steep liquor, the steeping time can be reduced considerably in a conventional steeping system and even further in a two stage steeping process, whereby the second steeping stage is carried out after course grinding. Also in case conventional steeping times are applied higher starch yields and lower energy consumption may be obtained. AS

Sorghum

1662 Bhise (VJ), Chavan (JK) and Kadam (SS). Effects of malting on proximate composition and in vitro protein and starch digestibilities of grain sorghum. Journal of Food Science and Technology, India 25(6); 1988; 327-329

The changes in dry matter, nutrient comp. and in vitro protein and starch digestibilities were studied during malting of grain sorghum. The steeping of grains in water for 10 to 30 h and germination at 30 C upto 72 h significantly decreased the dry wt. and starch while significantly increasing the water soluble proteins, free amino acids and reducing sugars in malted meal. The steeping of grains for 10 h and subsequent germination for 24 h significantly improved in vitro protein and starch digestibilities of the malted meal. However, prolonged steeping or germination of grains exhibited adverse effects on the digestibility of starch. The results indicated that 10 h steeping followed by 24 h germination is optimum to produce a sorghum malt for traditional food uses. AS

1663 Savage (GP). Influence of tannin-binding substances on the quality of yellow and brown sorghum. Nutrition Reports International 39(2); 1989; 359-366

In order to study and compare the nutritive value of yellow and brown sorghum the effects of feeding ground raw yellow or brown seeded sorghum to rats with or without additions of poly ethylene glycol (PEG) and polyvinyl pyrrolidone (PVP) were examined. These compounds bind to tannin more strongly than to protein. Each sample of yellow or brown sorghum was combined into semi-purified diets and fed to male weanling rats with the ground sorghum as the sole source of protein in each diet. It was found that the true digestibility of the brown sorghum was lower than yellow sorghum and with addition of PEG and PVP to brown sorghum improved the true digestibility of the protein whereas addition of PVP to yellow sorghum depressed the overall true digestibility and the biological value of both the yellow and brown sorghum was reduced on PVG addition. NGKR

1664 Throat (SS), Satwadhar (PN), Kulkarni (DN), Choudhari (SD) and Ingle (UM). Effect of various grain parameters on popping quality of sorghum. Journal of Food Science and Technology, India 25(6); 1988; 361-363

Nineteen cvs of grain sorghum (Sorghum bicolor) of kharif (July-October) harvest were assessed for their physical characteristics and their relationship with popping quality. The results indicated that there were significant genotypic differences in kernel wt., kernel vol., bulk density, true density, seed hardness, floaters percentage, seed moisture, vol. of pop, expansion ratio and popping percentage. Expansion ratio had significant positive effect due to seed hardness and bulk density, whereas, seed hardness had storage positive correlation with pop yield. Pop vol. did not show any relationship with any of the physical parameters tested. AS

PULSES

1665 Deshpande (SS) and Damodaran (S). Structure-digestibility relationship of legume 7S proteins. Journal of Food Science 54(1); 1989; 108-113

Structure-digestibility relationship was investigated in in vitro model systems for phaseolin and vicilin, the major 7S storage proteins of dry bean and green peas, resp. Native phascolin was more resistant to trypsinolysis than vicilin, while heating caused a reversal of proteolysis rates. Conformational studies using far-UV and near-UV CD spectroscopy suggested the native conformation of vicilin to be far more flexible to thermal treatment and SDS-induced environmental changes; however, neither the thermal treatment nor the anionic detergent caused a complete randomization of structure in either proteins studied. Ironically, the flexible native conformation of vicilin seemed to induce greater undesirable changes upon heating so as to confer resistance to proteolysis. The possible role of secondary and quarternary structures of these two proteins is discussed in relation to their digestibility. AS

Chickpeas

1666 Singh (DK), Rao (AS) and Singh (R). Amino acid composition of storage proteins of a promising chickpea (Cicer arietinum L.) cultivar. Journal of the Science of Food and Agriculture 43(4); 1988; 373-379

The amino acid comp. of flours made from the cotyledons and from the whole seeds of disease-resistant, stable and high-yielding cvs of chickpea (Cicer arietinum L) cv H75-35, known locally as Gaurav, have been analysed. These, together with similar analyses of the albumin, globulin, legumin and vicilin protein fractions, have been compared with those of other legumes. Seed protein content was 19.8% with globulin constituting 62.4% of the total seed protein. The ratios of albumin to globulin and legumin to vicilin were 1:4 and 6:1 resp. The proportion of basic amino acids in the albumin was low whereas the reverse was true in the globulin. The legumin fraction seems to be superior in terms of total essential amino acids to those from other sources. Sulphur amino acids were the most limiting, followed by tryptophan or threonine depending on the fraction. However, the ratio of methionine to cystine was high (2.76:1). The extent of the sulphur amino acid deficiency was assessed, and possible approaches for its improvement are outlined. AS

Faba beans

Faba bean proteins

1667 Ng (PKW), Hoshn (E) and Bushuk (W). Binding of vanillin of fababean proteins. Journal of Food Science 54(1); 1989; 105-107

Binding of vanillin by fababean protein micellar mass (PMM) in water suspensions was investigated. Free vanillin was determined by HPLC and data were evaluated by the Klotz equation. Increasing vanillin and PMM concn. increased the percentage of total vanillin bound to protein. Binding capacities of heat-treated (denatured) PMM were higher than that of untreated (native) PMM. Binding forces between vanillin and PMM were weak, and the number of binding sites increased when PMM was denatured. AS

Green peas

1668 Hung (Y-C) and Thompson (DR). Changes in texture of green peas during freezing and frozen storage. Journal of Food Science 54(1); 1989; 96-101

The effects of freezing (still-air, air-blast, and Frcon immersion freezing) and frozen storage (-5 C, -10 C, and 15 C for 0 to 48 wk) on texture of cooked frozen peas were examined. Peas frozen by a Frcon 12 immersion method with no appreciable damage to cell structure had firmer and more chewy sensory textural quality compared to those peas frozen by a slower freezing method. Sensory tenderness decreased initially and then increased with storage time to the max.

storage times of 6 wk in -5 C storage, 16 wk in -10 C storage, and 48 wk in -15 C storage. Sensory chewiness increased initially, then remained constant with storage time except in -15 C storage. Generally, the lower storage temp. resulted in less sensory chewiness. The correlation coeff. (r) between sensory and objective measurements for tenderness and chewiness were 0.76 and 0.88 ($P < 0.05$) resp. AS

Lupins

1669 Agosin (E), Diaz (D), Aravena (R) and Yanez (E). Chemical and nutritional characterization of lupine tempeh. Journal of Food Science 54(1); 1989; 102-104

Chemical composition and protein value of a tempeh-related food using lupin as substrate was determined. Bitter lupin grits were slowly degraded as compared to sweet lupin, pointing out the inhibitory action of lupin, alkaloids. Any fungal degradation of the latter could be determined. Sweet lupin tempeh was further characterized. Water-soluble substances increased during the first 17 h and then only slight changes occurred. The lipid fraction was preferentially metabolized by the fungus, reaching almost 50% loss after 45 h fermentation. Linolenic and erucic acids were particularly degraded. No significant increase of the NPR values or protein digestibility of fermented lupin were observed. Preliminary results of sensory evaluation of deep-fat fried lupin tempeh were promising. AS

1670 Hung (TV), Handson (PD), Amenta (VC), Kyle (WSA) and Yu (RST). Mineral composition and distribution in lupin seeds and in flour, spray dried powder and protein isolate produced from the seeds. Journal of the Science of Food and Agriculture 45(2); 1988; 145-154

The mineral comp. and the distribution of mineral elements between the seed hull and endosperm was examined for 33 samples from two sp. of lupin seeds (Lupinus albus and L. angustifolius) grown under field conditions in Victoria, Australia. The mineral composition of lupin protein isolate prepared from both species can be compared favourably with that of soy protein isolate. The results of this study indicate a potential for replacing soy protein isolate with lupin protein isolate. UJSPR

1671 Olias (JM) and Valle (M). Lipoxygenase from lupin seed. Purification and characterisation. Journal of the Science of Food and Agriculture 45(2); 1988; 165-174

Lipoxygenase (EC 1.13.11.12) from lupin seeds (Lupinus albus cv multolupa) was partially purified (38.4-fold) by ammonium sulphate fractionation, hydrophobic chromatography and gel filtration. The enzyme was associated with membrane fragments of high particle wt. Its optimum pH was 6.1 and it had K_m values for linoleic and linolenic acids of 0.24 and 0.37 mM, resp. Mol. wt. detn. gave a value of 92000. Incubation of linoleic acid with partially purified enzyme afforded a mixture of 13-hydroperoxy-9-cis, 11-trans-octadecadienoic and 9-hydroperoxy-10-tans, 12-cis-octadecadienoic acids in which the ratio of isomers was 16.9. AS

Mucuna beans

1672 Ravindran (V) and Ravindran (G). Nutritional and anti-nutritional characteristics of mucuna (Mucuna utilis) bean seeds. Journal of the Science of Food and Agriculture 46(1); 1988; 71-79

Some nutritional and anti-nutritional characteristics of mucuna bean seeds were studied. The mature seeds contained 264g crude protein, 63g crude fibre, 41g crude fat 37g ash and 595 g carbohydrates kg DM. These seeds were reported to be rich in essential amino acids except sulphur amino acids. Raw seeds contained moderately higher levels of trypsin inhibitor and also, phytate and tannins. The authors, mentioned that these seeds are known to have lot of medicinal uses. It is concluded that these seeds can be used as a food source after suitable processing methods were used for removing anti-nutritional factors. UJSPR.

Pigeon peas

1673 Srivastava (S), Mishra (DP) and Khare (BP). Biochemical composition of stored pigeon pea (Cajanus cajan. L.) in relation to bruchid damage. Journal of Food Science and Technology, India 25(6); 1988; 375-376

The comp. of pigeon pea seeds stored for one yr in wooden, steel and mud bins was studied in relation to field borne infestation by Callosobruchus chinensis L. The highest increase in insect population and consequent damage to seeds occurred in the mud bin followed by steel and wooden bin. There was a significant increase in crude protein, crude fibre, total ash as well as reducing sugars, but decrease in total carbohydrates including non-reducing sugars, crude fat and physiological energy of the seed at one yr storage. AS

Red grams

1674 Narasimha (HV), Srinivas (T) and Desikachar (HSR). A historical basis for `hard-to-Cook' phenomenon in red gram (Cajanus cajan) cultivars. Journal of Food Science 54(1); 1989; 125-127

Sections of cotyledons (dhals) and leached starch granules in red gram (Cajanus cajan), were examined microscopically. The average expansion ratios of good cooking (GCD) and poor cooking (PCD) dhals were 1.8 and 1.4 cotyledons; 2.4 and 2.0 for cells at 30 min cooking, and 6.5 and 5.5 for starch granules at 6 min cooking, resp. Cells and starch granules of GCD dispersed freely and quickly into the medium while those of PCD tended to disperse slowly and remain in clusters. The variation in expansion, separation and clustering properties of cells and starch granules during cooking caused cookability differences on red gram cvs. AS

Tepary beans

1675 Idouraine (A), Tinsley (AM) and Weber (CW). Nutritional quality and sensory acceptability of akara prepared from germinated tepary beans. Journal of Food Science 54(1); 1989; 114-117

Tepary beans, Phaseolus acutifolius (ungerminated and germinated for 48 h) were used to prepare akara. Cowpeas, ungerminated and germinated teparies, uncooked and cooked akara prepared from teparies and cowpeas were analyzed for proximate comp., amino acid (AA) profile, vitamin A, ascorbic acid and trypsin inhibitor activity (TIA). Proximate comp. and AA profiles of ungerminated teparies and cowpeas were similar. Germination increased protein, vitamin A, and ascorbic acid by 12%, 56%, and 23-fold, resp. TIA decreased by 2.9% while AA profiles showed slight to no change. Frying lowered protein, vitamin A, ascorbic acid, and TIA by 7%, 35-40%, 75-82%, and 12.6-24.3%, resp. Taste panels found no significant differences (P less than or equal to 0.05) in colour, texture or flavour among the products. AS

Winged beans

1676 Shet (MS), Madaiah (M) and Nazeer Ahamed (R). Effect of raw winged bean (Psophocarpus tetragonolobus (L.) DC) tuber lectin on gastrointestinal tract of growing rats. Indian Journal of Experimental Biology 27(1); 1989; 58-61

The fraction containing high hemagglutinating activity was prepared from raw winged bean tubers and orally administered (at 30 and 70 mg of raw lectin per 100 g body wt.) to growing rats. The food intake and body wt. of rats decreased with increase in level of lectin, and significant lectin activity was detected in the faeces extracted from these rats which is anti-genically similar to the native lectin preparation. Microscopic examination revealed the morphological changes in the intestinal epithelial cells. The binding action of the lectin to the mucosal epithelia of the gastrointestinal tract is indicative of the deleterious effects caused by the winged bean tuber lectin. KAR

OILSEEDS AND NUTS

Cashew nuts

1677 Nagaraja (KV). In vitro digestibility of cashew kernel protein. Current Science 58(13); 1989; 769-771

Cashew kernel protein extracted at pH 10.0 was denatured by heating or by heating with SDS and Beta -mercaptoethanol. In vitro digestion of cashew kernel protein by trypsin indicated higher rate of reaction in the first 15 min unlike in BSA where the rate of reaction was linear upto 60 min. Hence, the exp. were restricted only to 15 min. The digestibility of kernel protein extracted at pH 10.0 compared well with that of haemoglobin and BSA but, the digestibility of that extracted at pH 4.0 was much less. Protein extracted at pH 4.0 was less susceptible to digestion by trypsin and Alpha-chymotrypsin compared to protein extracted at pH 10.0. Digestibility of pepsin was slightly higher in protein extract at pH 4.0 than at pH 10.0. Denaturation by heat and SDS enhanced digestibility, but SDS did not enhance digestibility in all the cases. It is concluded that cashew var. differ considerably in their in vitro digestibility of kernel protein. KAR

Groundnuts

1678 Kshemkalyani (SB) and Patel (GS). Investigation of aflatoxin contamination in commercial groundnuts. Journal of Food Science and Technology, India 25(6); 1988; 364-365

Groundnuts stored and sold in Ahmednagar city and nearby villages were analysed for the presence of aflatoxin B_1 (AFB1) aflatoxin B_2 (AFB2), aflatoxin G_1 (AFG1) and aflatoxin G_2 (AFG2). Out of 96 samples analysed, 75 samples showed the presence of AFB1. Among them, 37 samples showed AFB1 above acceptable limit (120 μ/Kg). Three samples showed presence of AFB2, while AFG1 and AFG2 were not detected. Storage in open containers with other cereals and high moisture content (70-80% relative humidity) in storing rooms was observed in most of the shops. AS

Groundnut flour

1679 Pominski (J) and Vinnett (CH). Production of peanut flour from microwave vacuum-dried peanuts. Journal of Food Science 54(1); 1989; 187-189

Defatted peanut flours with significantly reduced raw peanut taste and N solubility of 85 + % were produced from field Runner peanuts that had been microwave-vacuum-dried to max. temp. of 80 and 96 C. The flours were prepared from 4.54 kg of peanuts, dried from 25.5% to less than 10% moisture, at 375 Torr absolute pressure and at 1400 and 813 watts microwave power (2450 MHZ). Peanut temp. at end of drying significantly affected the intensity of the raw peanut flavour. Storage at 23.9 C for 14 months had no significant effects on intensity of the raw peanut flavour. Hexane extraction of blanched peanut kernels showed that mass velocity percolation rates increased with increase in final drying temp. of peanuts. AS

Linseeds

Linseed proteins

1680 Dev (SK) and Quensel (E). Functional properties of linseed protein products containing different levels of mucilage in selected food systems. Journal of Food Science 54(1); 1989; 183-186

High-mucilage protein conc. (HMPC) from linseed and linseed expeller cake had a good emulsion stabilizing effect in canned fish sauce and performed relatively better than a low-mucilage protein isolate (LMPI). Low-mucilage flour (LMF) and protein conc. (LMPC) as well as the HMPC samples and LMPI reduced cooking loss of meat emulsion and firmness of the cooked emulsion. Overall, LMF and LMPC performed better than other linseed products in meat emulsion. In ice cream, the HMPC samples and LMPI had a stabilizing effect comparable to that of gelatin. AS

Rapeseeds

1681 Blyel (DWR), Lewerenz (H-J) and Plass (R). Prenataltoxicological study of rapeseed meal and of the fungicide maneb in dependence of maternal ages. Nahrung 32(10); 1988; 1007-1010

The rate and degree of prenataltoxic effects are depending even on maternal factors (sp. differences, strain, biotransformation ability). In this regard there fails aimed experiments, that examine the influence of parity and maternal ages. On the whole up to now there are mainly examinations on age-related changes in liver drug-metabolizing enzymes in male animals specially in rats. Also in prenataltoxicology this problem is significant because in the human population the age of pregnant women fluctuates between 13 and 45 yrs. Therefore in a comparison study with nulliparous 10-wk-old and one-yr-old breeding rats (fifth pregnancy) maternal and prenataltoxicological effects of rapeseed meal in food and/or of the fungicide maneb (manganese ethylenebis(dithiocarbamate) were investigated. AS

1682 Fiebig (H-G), Sendfeld (A) and Aitzetmiller (K). Methods for the determination of total glucosinolate content in rapeseed. FAT Science and Technology 90(12); 1988; 459-464 (De).

For the detn. of the total glucosinolate content in rapeseed samples there are several different methods currently in use in the Federal Republic of Germany. Apart from the official EC-method (GLC), the rapeseed samples were also analysed by national methods (HPLC, glucose, X-ray fluorescence- spectrascopy) and rapid screening methods (00-DIP-test, miniphotometer test, reflectometer test). All these methods have been compared with each other, using samples from last yr's harvest. In most cases the (GC results are lower than those of the national methods or rapid tests. AS

Rapeseed meal

1683 Finnigan (TJA) and Lewis (MJ). Ethanolic extraction of commercial rapeseed meal in the production of protein concentrate of reduced glucosinolate content. Journal of the Science of Food and Agriculture 45(2); 1988; 155-163

The aim of this work was to investigate suitable extraction procedures for the production of a protein conc. of significantly reduced glucosinolate content from commercial rapeseed meal. The level is a factor in deciding its suitability for either animal or human food. Ethanolic extraction was studied as a function of time, solvent to meal ratio and solvent comp., to minimise concomitant losses of solids and nitrogen. Rapeseed meal was extracted over the range of 0 to 100% (v/v) aqueous alcohol. A concn. of 80% was found to give the best compromise between glucosinolate extraction and other component loss, but glucosinolate extraction was only about 30%. Increase of solvent polarity improved glucosinolate extractability, but extraction yields greater than 70% were not found. Subsequent extraction of the pretreated meal with water at pH 11.0 gave extracts of lower glucosinolate concn. than those made from non-pretreated meal, but residual concn. of the glucosinolate were unacceptable. Additional hydrolysis of the glucosinolates by exogenous myrosinase is proposed to improve extractability. AS

Soybeans

1684 DiPietro (CM) and Liener (IE). Heat inactivation of the Kunitz and Bowman-Birk soybean protease inhibitors. Journal of Agricultural and Food Chemistry 37(1); 1989; 39-44

The most abundant soybean protease inhibitors (SBPI) are the Kunitz inhibitor (KSTI) and the Bowman-Birk inhibitor (BBI). With use of enzymatic and immunochemical techniques to distinguish between the two inhibitors, inactivation of KSTI and BBI during various types of heat treatment was investigated. Solutions of purified KSTI and BBI heated (100 C) along with a crude extract of raw soy flour. The soy extract lost inhibitory activity most rapidly, while purified KSTI lost inhibitory activity at an intermediate rate and purified BBI lost inhibitory activity very slowly. When the inhibitors, in pure form or in situ, were heated (75-95 C) within a soy flour matrix, dramatically different results were obtained. SBPI in situ still lost inhibitory activity most rapidly. However, purified BBI was inactivated more quickly than purified KSTI. This result conflicts with the commonly held belief that BBI is a heat-stable protease inhibitor regardless of heating conditions. AS

1685 Ishida (T), Koba (K), Sugarno (M), Imaizumi (K), Watanabe (S) and Minoshima (R). Cholesterol levels and eicosanoid production in rats fed phosphatidylinositol or soybean lecithin. Journal of Nutritional Science and Vitaminology 34(2); 1988; 237-244

Effect of phosphatidylinositol prepared from sufflower seeds and of soy lecithin on the cholesterol level and eicosanoid production of rats has been studied. KAR

1686 Okubo (K). DMF (Dry mouth feel, undesirable) components of soybean and behaviour of the components on soybean food processing. Journal of Japanese Society of Food Science and Technology '(Nippon Shokuhin Kogyo Gakkaishi') 35(12); 1988; 866-874 (Ja).

Soy products

Soy sauce

1687 Miyashiro (R). Enzymatic hydrolyzation of stevioside by raw soy sauce. Utilization of steiva sweetner on soy sauce. Part III. Journal of Japanese Society of Food Science and Technology '(Nippon Shokuhin Kogyo Gakkaishi') 35(12); 1988; 843-845 (Ja).

Stevioside (\$Beta\$-D-glucosylester of 13-O- Beta -sophorosyl steviol) was hydrolyzed by the enzyme in raw soy sauce. The hydrolysate was identified as rubusoside (Beta-D-glucosyl ester of

13-O-$Beta$-D-glucosyl steviol) by its physical properties. The sweetness of rubusoside was about 0.3 times of stevioside on the 0.1% (w/v) concn. of aqueous solution. AS

Soy proteins

1688 Kamata (Y) and Kinsella (JE). A comparison of creep phenomena in food protein gels. Journal of Food Science 54(1); 1989; 170-172

Rheological properties of gels made by heating (90 C for 20 min) and subsequent cooling (5 C) dispersions of gelatin, soy protein isolate, and a mixture of whey protein and casein were determined by creep measurements at various temp. The elastic component of soy protein isolate gels became soft with increasing temp. but did not fully melt even at 90 C. Whey protein conc. gels deformed continuously upon compression above 70 C, reflecting viscous flow. The gel obtained from a mixture of casein and whey protein conc. following acidification with glucono-$Delta$-lactone and heating revealed significant plastic deformation, indicating the network was formed by packing of small size particles. AS

TUBERS AND VEGETABLES

Bulb vegetables

Onions

1689 Narasimha Reddy (P), Azeemoddin (G) and Thirumala Rao (SD). Processing and analysis of onion seed (Allium cepa) and its fixed oil. Journal of the American Oil Chemists" Society 66(3); 1989; 365

The characteristics of onion seed (Alium cepa) and its fixed oil are reported. The component fatty acids of the oil by GLC are: palmitic, 7.2%; stearic, 1.2%; oleic, 33.5% and linoleic, 58.1%. The oil was refined and bleached to a light colour. AS

Root vegetables

Carrots

1690 Juliot (KN), Lindsay (RC) and Ridley (SC). Directly-acidified carrot slices for ingredients in refrigerated vegetable salads. Journal of Food Science 54(1); 1989; 90-95

Several food grade acidulants were evaluated for direct-acidification of blanched carrot slices for use in salads. Fumaric acid, acetic acid, and a citric/acetic acid combination applied by a non-buffered immersion-equilibrium system provided excellent microbial control and satisfactory flavour quality for carrots in salads. Acidified blanched carrots prepared with buffered, potassium sorbate supplemented, fumaric acid solutions ranging in pH from 3.5-4.2 also provided acceptable salads. Dry application of a fumaric/citric acid combination containing potassium sorbate resulted in good retention of fresh-like properties when carrot slices were stored in carbon dioxide atmospheres. Storing acidified carrots in air caused rapid formation of ionone-like floral aromas from the autoxidation of beta-carotene. AS

Tubers

Potatoes

1691 Low (N), Jiang (B), Ooraikul (B), Dokhani (S) and Palacic (MM). Reduction of glucose content in potatoes with glucose oxidase. Journal of Food Science 54(1); 1989; 118-121

Two commercial glucose oxidase preparations, DeeO 1500 and Fermcozyme CBB-750, were investigated for their activities and use in decreasing glucose levels in Norland and Shepody potatoes. When DeeO was added at 0.01% by wt. of peeled potatoes, glucose of potato extracts of both cvs was decreased by about 22% when the extracts were first blanched, and about 15% if not blanched, indicating the presence of some inhibitors in raw potatoes. When applied to steam-blanched potato strips, 0.10% (v/v) solution of Fermocozyme reduced glucose by 25-35%. These exp. showed a potential use of glucose oxidase as a processing aid to reduce nonenzymatic browning in potato products. AS

1692 Munshi (CB) and Mondy (NI). Ascorbic acid and protein content of potatoes in relation to tuber anatomy. Journal of Food Science 54(1); 1989; 220-221

Localization of the nutrients, ascorbic acid and protein in the tuber was investigated. Katahdin, Norking Russet, and Shepody potato cvs were used in this study. Cortex and pith areas were compared for ascorbic acid and protein content. Ascorbic acid of all the three cvs was significantly higher ($P < 0.01$) in the pith than in the outer cortex region and the protein content was significantly higher ($P < 0.01$) in the cortex than the pith area. The pith region was significantly ($P < 0.05$) higher in nonprotein N than the cortex area. Since only 2% of the protein content of the entire tuber was located in the peel, peeling the tuber did not cause a significant loss of protein. AS

1693 Shashirekha (MN) and Narasimham (P). Comparative efficacies of gibberellic acid (GA) and ethrel mixture and other established chemicals for the induction of sprouting in seed potato tubers. Journal of Food Science and Technology, India 25(6); 1988; 335-339

Comparative efficacies of several growth promotary chemicals viz. gibberellic acid, ethrel, thiourea, rindite and carbon disulphide were assessed for breaking dormancy and/or sprouting of seed potato tubers. Although all the chemicals tested were effective, they were considered as inferior to GA + E treatment for commercial applications because of their toxic nature or need for higher concn. and/or longer duration of treatment. A dip in a mixture of GA + E (60 + 40 p.p.m.) for 10 min for whole tubers was good. Further field trials showed an increase in tuber yield with GA + E and rindite treatments compared to untreated tubers. AS

1694 Stoddard-Gilbert (K) and Blincoe (C). Chromium in potatoes. Journal of Agricultural and Food Chemistry 37(1); 1989; 128-131

Chromium concn. in potatoes was determined, and tubers were labeled either intrinsically or extrinsically with radioactive chromate. A labeled Cr complex was isolated from preparations of raw, baked, or fried potatoes and chromatographed on gel permeation media. Potato pulp and peel contained 1.63 and 2.70 ug of Cr/g tissue, resp. There was no correlation between the two, nor did they respond similarly to changes of var. or locations. No significant differences were apparent in relative migration of the isolated complexes except between raw and cooked extrinsically labeled preparations. AS

Vegetables

1695 Tiedink (HGM), Davies (JAR), Van Broekhoven (LW), Van der Kamp (HJ) and Jongen (WMF). Formation of mutagenic N-nitroso compounds in vegetable extracts upon nitrite treatment. A comparison with the glucosinolate content. Food and Chemical Toxicology 26(11/12); 1988; 947-954

Cauliflowers

1696 Romo-Parada (L), Willemot (C), Castaigne (F), Gosselin (C) and Arul (J). Effect of controlled atmospheres (low oxygen, high carbon dioxide) on storage of cauliflower (Brassica oleracea L., Botrytis group). Journal of Food Science 54(1); 1989; 122-124

Cauliflowers were stored for 9 wk in air or in N containing 3% O and 0, 2.5, 5 or 10% carbon dioxide at 1 C and 100% relative humidity, with or without pretreatment with 15% carbon dioxide. Consumer visual acceptability and several maturity indicators (wt. loss, rate of respiration, leakage of free Alpha-amino compounds, levels of free sugars and organic acids) were determined. The samples exposed to 5% or less carbon dioxide were still acceptable after 7 wk of storage, while 10% carbon dioxide and pretreatment with 15% carbon dioxide caused softening, yellowing and increased leakage. Respiration was decreased by low oxygen. Increasing carbon dioxide up to 5% brought additional benefit. Succinic acid increased with increasing carbon dioxide. AS

Eggplants

1697 Fujita (S) and Tono (T). Purification and some properties of polyphenoloxidase in eggplant (Solanum melongena). Journal of the Science of Food and Agriculture 46(1); 1988; 115-123

Leafy vegetables

1698 Chawla (S), Saxena (A) and Seshadri (S). In vitro availability of iron in various green leafy vegetables. Journal of the Science of Food and Agriculture 46(1); 1988; 125-127

In this investigation ascorbic acid and oxalic acid contents in Indian green leafy vegetables were determined and their relationship to the in vitro availability of the Fe content was studied. The effect of addition of different green leafy vegetables on the in vitro availability of iron from a habitual cereal meal was also studied. UJSPR

Alfalfa

1699 Hernandez (A), Martinez (C) and Alzueta (C). Effects of alfalfa leaf juice and chloroplast-free juice pH values and freezing upon the recovery of white protein concentrate. Journal of Agricultural and Food Chemistry 37(1); 1989; 28-31

Juice extracted from alfalfa was frozen at -25 C and stored for different periods of time. After the juice was adjusted to pH 8.0, 8.5, and 9.0 and pH 6.0 as control, the green proteins were separated by heat treatment. Soluble or white proteins were coagulated in the resulting chloroplast-free juice at two different pH values, 3.5 and 4.0. Thn results show that greater amounts of dry matter and N are recuperated in the white protein concn. at alkaline pH value than at the natural pH value, 6.0, and the amount of conc. recovered is also greater when soluble proteins are coagulated at pH 3.5 instead of 4.0, although the resulting conc. has less protein. With regard to the effect of freezing, it was possible to conclude that freezing of the juice was not a desirable storage method because it resulted in the coagulation and subsequent loss of most of the soluble proteins. AS

Tomatoes

1700 Azzi (A), De Clemente (IM), Valletrisco (M) and Niola (I). Sugar content of tomato sauces. A comparison between two methods. Industrie Alimentari 27(262); 1988; 627-628 (It).

Within a research carried out on tomato sauces, the authors aim at comparing Fehling method to HPLC for the dosage of total sugars. Pointing out a sufficient agreement among the data, they establish a correlation by which the HPLC values can be expressed according to Fehling method. AS

1701 Zamora (R), Maclas (P) and Mesias (JL). Carotene cooxidation activity of tomato lipoxygenase. 2. Nahrung 32(10); 1988; 965-969

The tomato isoenzyme lipoxygenase-2 presented a carotene cooxidation activity; it showed more activity with linoleic acid as substrate that with linolenic acid. The lipoxygenase was inhibited by reagents of the disulphide groups (diethiothereitol and 2-mercaptoethanol) and -SH groups (4-hydroxymercuri) benzoic acid and iodoacetamide) and some antioxidants. AS

Tomato products

1702 Porretta (S) and Leoni (C). Preparation of high-consistency tomato products by microwave heating. Industria Conserve 63(3); 1988; 244-247 (It).

Inactivation of enzymes, in particular pectolytic ones, is obtained in tomatoes by heating the crushed fruits to temp. above 85 C in the shortest possible time (hot-break technique). Tests were conducted to evaluate the possibility of preparing higher-quality products in comparison with commercial ones by using as heating medium microwaves applied to whole tomatoes before crushing. Results of analyses (pH, colour, soluble solids, total solids, ethanol-insoluble pectic substances and free galacturonic acid) of products obtained by conventional techniques were compared with those of products obtained by microwave heating. The results were clearly in favour of the microwave method, even if it appears at first to be more onerous because of the investment required. AS

Tomato ketchup

1703 Upasana (R), Abbott and Bains (GS). preliminary studies on the effect of pectin and guar gum thickness on the flow properties of tomato ketchup from cold break stock. Indian Food Packer 43(2); 1989; 21-28

Pectin and guar gum affect the flow behaviour and sensory properties of tomato ketchup prepared from cold break stock. Ketchups containing 0.25 to 1.25% added pectin and 0.125 to 0.75% guar gum were prepared. On increasing the level of thickeners in the ketchup, the tendency to seepage of serum was reduced. Apparent viscosity of ketchups from cold stock increased as the level of pectin or guar gum was increased. The activation energy values increased by 23.3 and 30.6% on adding 0.5 and 1.0% pectin and 28.4 and 29.9% on adding 0.125 and 0.25% guar gum to the ketchup resp. Casson's 'yield values' and Michael's and Bolger model parameters indicative of force needed for breaking of net work structures-aggregate and viscous flow, also increased with the addition of pectin and guar gum. KAR

Tomato pastes

1704 Leoni (C), Aldini (R) and De Cesari (L). Packaging of tomato paste in flexible aluminium/plastics laminate pouches. Industria Conserve 63(3); 1988; 234-243 (It).

Results of a test on the suitability of aluminium/plastics laminate pouches for packaging tomato paste are reported. The product packaged in small-sized Doy-pack pouches manufactured by the firm Grace was found to have a shelf-life at least as long as that of its counterpart in tinplate cans. BV

FRUITS

1705 Castells Galindo (L), Hardisson (A) and Garcia-Montelongo (F). Mn, Cu, Fe and Zn concentration levels in fruit and vegetables salads. Intermetallic correlations. Industria Conserve 63(3); 1988: 229-233 (It).

Concn. levels of Mn, Fe, Cu and Zn were determined in fruit and vegetable salads (homogenized product and individual components) by AAS with air/acetylene flame. The following mean values were found in the homogenates; vegetable salads X_{MN} = 1.81 p.p.m. X_{Fe} = 8.62 p.p.m., X_{Cu} = 1.71 p.p.m. and X_{Zn} = 2.39 p.p.m.; fruit salads, X_{MN}= 1.61 p.p.m. X_{Fe} = 5.42 p.p.m., X_{Cu} = 1.98 p.p.m. and X_{Zn} = 0.91 p.p.m. Simple and multiple intermetallic correlation studies were also carried out. A significant multiple correlation between Zn and Mn, Fe and Cu was found in cherries. AS

1706 Vijaya Sethi and Maini (SB). Appropriate technology for reducing post harvest losses in fruit and vegetables. Indian Food Packer 43(2); 1989; 42-56

Methods of control of spoilage by physical and chemical application during handling, ripening, packaging, transportation, storage and processing of fruits and vegetables have been reviewed with particular reference to India and taking mostly tropical fruits. Reference is also made for proper utilization of horticultural wastes and educating the consumers. KAR

Apples

1707 Kimura (S), Narumi (F) and Okamoto (T). A consideration on the chilling injury mechanism from the aspect of molecular species of phosphatidylcholine in apples cv. Fuji. Studies on chilling injury of apples, Part XI. Journal of Japanese Society of Food Science and Technology '(Nippon Shokuhin Kogyo Gakkaishi') 35(12); 1988; 823-827 (Ja).

To clarify the chilling injury mechanism of apples the mol. sp. of phosphatidylcholine in apples cv. `Fuji' were examined by means of argentation thin layer and gas liquid chromatographies. The results obtained were as follows: (1) In the case of a sample just after harvest, the bands of phosphatidylcholine with 100% or near 100% of unsaturated fatty acid comp. were found by the above methods. Furthermore, in those bands, the linolenic acid (18:3) ratio was over 50%. The above facts seem to be one of the reasons why chilling injury does not occur in the apples cv. `Fuji'. (2) Furthermore, in the case of samples after 5, 7 and 9 months storage at 0 C, the bands with over

80% of unsaturated fatty acid comp. were detected. This fact seems to be one of the reasons why the apples cv. \`Fuji' do not show chilling injury and therefore are suitable for cold storage. 3) The kinds of mol. sp. of phosphatidycholine in the apples cv. Fuji decreased after cold storage for seven months. AS

Apricots

1708 French (DA), Kader (AA) and Labavitch (JM). Softening of canned apricots. A chelation hypothesis. Journal of Food Science 54(1); 1989; 86-89

Infiltration of apricot (Prunus armeniaca L.), Patterson cvs fruits, which are susceptible to rapid softening, with CaCl before processing resulted in definite firming of the canned apricots. Non-susceptible fruits treated with citrate buffers (pH 3.7) showed dramatic post-process softening. In individual, untreated, early, green fruit, firmness after processing was directly correlated with the bound Ca:citrate ratio. Based on a chelation hypothesis, it was proposed that softening was accelerated when chelators such as organic acid anions removed structure Ca from the cell wall once cell membranes were lysed by heating. AS

1709 Sud (G) and Bhutani (VP). Effect of nutrients and growth regulators on the storage behaviour of apricot Cv. New Castle. Indian Food Packer 43(2); 1989; 29-33

Three mineral nutrients (H3 BO3 (0.2%), calcium chloride (0.5%), potassium nitrate (0.5%) and three growth regulators gibberellic acid (GA) (50 p.p.m.); malic hydrazide (MH) (1000 p.p.m.) and SADH (1000 p.p.m.) were sprayed at the pit hardening stage on full bearing New Castle apricot. Calcium chloride + MH treated fruits controlled the rate of respiration and maintained better firmness of the fruit during 30 days storage at 0 C. Acid content was highest with SADH treated fruits; total soluble solids content remained unaffected by the treatments. VKR

Bananas

Banana powder

1710 Lal (BB), Genzalez (AM), AlWesali (M) and Parmar (YS). Some aspects in storage behaviour of freeze dried banana powder. Indian Food Packer 43(2); 1989; 38-41

Ripe bananas were peeled, sliced and freeze dried with and without sulphitation and ground into powder, sealed in laminated pouches of polyester, Al. foil and polypropylene under air/carbon dioxide atm. They were stored at -20 C , 30 C and 45 C for 10 days. Browning of the product was greater at 45 C than at 30 C or at -20 C (control). Sulphite treatment gave lighter colour than without sulphite treatment. Storage under carbon dioxide at 45 C showed less darkening than those stored in air. Powdered banana was better when sulphited and packed in carbon dioxide and stored at low temp. KAR

Guava

1711 Nishimura (O), Yamaguchi (K), Mihara (S) and Shibamoto (T). Volatile constituents of guava fruits (Psidium guajava L.) and canned puree. Journal of Agricultural and Food Chemistry 37(1); 1989; 139-142

Kiwifruits

1712 Matsui (T) and Kitagawa (H). Seasonal changes in invertase activity in relation to sugar content in Kiwifruit. Journal of Japanese Society of Food Science and Technology '(Nippon Shokuhin Kogyo Gakkaishi') 35(12); 1988; 856-859

This paper reports seasonal changes in sugar content and activity of acid invertase in the kiwifruit (Actinidia chinensis Planch, cv. Koryoku). The main purpose of the study was to investigate seasonal changes of sugar contents on the basis of acid invertase activity and its properties of `Koryoku' kiwifruit. The acid invertase in the soluble fraction showed higher activity than that in the cell wall-bound fraction. The highest activity of the acid invertase was found in November and the highest sugar content was also observed in the same period. The acid invertase has a mol. wt. of Ca 67 000, optimum pH of Ca. 5.0, optimum temp. of 45 $degree$ C and 24.6 mM Km value for sucrose. AS

1713 Matsui (T) and Kitagawa (H). Seasonal changes in pectinmethylesterase and polygalacturonase activities in kiwifruit. Journal of Japanese Society of Food Science and Technology '(Nippon Shokuhin Kogyo Gakkaishi') 35(12); 1988; 851-855

This paper describes the seasonal changes in pectin content and pectinmethylesterase (PE) and polygalacturonase (PG) activities in two cvs of kiwifruits, 'Koryoku' and 'Hayward'. The main purpose of the study was to investigate the seasonal changes in pectin content on the basis of PE and PG activities and their properties. PE showed highest activity in September in both cvs and decreased to about half in November. On the other hand, PG showed almost constant activities in both cvs. Total pectin (TP) content was highest in September for 'Koryoku' and in October for 'Hayward', whereas water soluble pectin (WSP) was lowest in October for both cvs. AS

1714 Shorter (AJ) and Scott (KJ). Controlled atmosphere storage of kiwifruit using an ultra violet scrubber to remove ethylene. CSIRO Food Research Quarterly 47(4); 1987; 85-93

Mangoes

1715 Reddy (YTN) and Gorakh Singh. Physico-chemical characteristics of some polyembryonic varieties of mango. Indian Food Packer 43(2); 1989; 34-37

Ripe mango fruits of polyembryonic var. (Starch, Mylepelian, Olour, Prior, Kensington, Kurukan, Nakare, Bappakai, Kitchner, Vellaikulamban, EC 95862, Peach and Muvandan) were analysed for physical and chemical characteristics. The fruit wt. ranged from a max. of 113.0 g in Mylepelian to 411.3 in Kensington. The pulp wt. ranged from 49.10 g in Mylepelian to 276.34 g in Kensington and the pulp/stone ratio was max. in Kensington (6.34) followed by Peach. Prior and Muvandun whereas it was lesser in Starch. The acidity was max. in Starch, Olour and Nakare (0.32%) and least (0.06%) in Kitchener and Peach. Ascorbic acid was highest in Olour (235 mg/100 g) followed by Kurukan, EC 95862 and Kensington and least (50 mg/100 g) in Muvandan. Kensington showed max. carotenoids (3.86 mg/100 g) Olour has min. (1.80 mg/100 g) carotenoid content. VKR

Olives

1716 Isabel Minguez-Mosquera (M), Garrido-Fernandez (J) and Gandul-Rojas (B). Pigment changes in olives during fermentation and brine storage. Journal of Agricultural and Food Chemistry 37(1); 1989; 8-11

The qualitative and quantitative variations taking place in the original chloroplastic pigment comp. have been analyzed during lactic fermentation and subsequent brine conservation of the fruit. The study shows that chlorophyll degradation during the elaboration of table olives can take place by two different mechanisms, resulting in a mixture of pheophytins and pheophorbides in the final product. With respect to the carotenoid fraction, only Beta -carotene and lutein are resistant to the preparation process. The precursors phytofluene and $Zeta$-carotene disappear, and vilaxanthin, luteoxanthin, and neoxanthin give rise to their isomers auroxanthin and neochrome. The fact that the total balance of pigments remains constant with time indicates that the degradation taking place implies only transformation of the pigments and does not give rise to uncoloured final products with pigmentation loss. AS

Oranges

1717 Hsu (W-J), DeBeneditc (C), Lee (SD), Poling (SM) and Yokoyama (H). Preharvest prevention of regreening in Valencia oranges (Citrus sinensis (L.) Osbeck). Journal of Agricultural and Food Chemistry 37(1); 1989; 12-14

Preharvest treatment with bioregulators (N, N-diethylamino) ethoxylbenzophenone (1), N,N-diethyloctylamine (2), and (N,N-diethylamino)ethyl p-bromobenzoate (3) reduced chlorophyll biosynthesis in the flavedo of Valencia oranges (Citrus sinensis (L.) Osbeck]. Bioregulator treatment not only reduced regreening but also increased total xanthophyll content and gave the fruit better colouration. AS

1718 Pesis (E) and Avissar (I). The post harvest quality of orange fruit as affected by pre storage treatments with acetaldehyde vapour or anaerobic conditions. Journal of Horticultural Science 64(1); 1989; 107-113

Early in harvest season, oranges are too acidic and their peel is still green, which make the fruits unacceptable to consumers. Ethylene treatment did not reduce acidity at the early harvest stage. Short term treatment of acetaldehyde (AA) vapour for 24 h or g anaerobic conditions resulted in significant degradation of acid and enhancement of volatiles production for better aroma development. The methods of treatments and its results are described. BAP

Peaches

1719 Torreggiani (D), Giangiacomo (R), Bertolo (G) and Abbo (E). Research on the osmotic dehydration of fruits. III. Suitability of Clingstone peach varieties. Industria Conserve 63(3); 1988; 223-228 (It).

The suitability of three clingstone peach cvs. (Carson, Baby Gold 6, Vivian) for processing into shelf-stable products by osmotic dehydration was studied. The products obtained were evaluated both during processing and during storage at room temp. for 6 months, by assessing their chemical, physico-chemical and sensory properties. Results showed that all 3 cvs were suitable for osmotic dehydration and that the finished product mantained good colour, flavour and texture throughout the 6 months of storage. AS

Strawberries

1720 Zegota (H). Suitability of Dukat strawberries for studying effects on shelf life of irradiation combined with cold storage. Zeitschrift fur Lebensmittel-Untersuchung und -Forschung 187(2); 1988; 111-114

A new Dukat var. of strawberries was used to study the effect of irradiation combined with cold storage on their shelf life and chemical comp. Strawberries, with or without stems, were irradiated with a dose of 2.5 or 3.0 kGy within 6-10 or 20-24 h after harvesting. Results of the sensory evaluation showed that the min. storage time for the fruits could be extended by a min. of 9 days. If the time between harvest and irradiation was shorter, better results for storage exp. were obtained. Fruits with stems were more suitable for cold storage after irradiation than those without stems. Irradiation of strawberries did not change the titratable acidity and content of the reducing sugars. Colour intensity and ascorbic acid levels decreased in proportion to the absorbed dose and storage time. AS

Watermelons

1721 Abbey (SD), Heaton (EK), Golden (DA) and Beuchat (LR). Microbiological and sensory quality changes in unwrapped and wrapped sliced watermelon. Journal of Food Protection 51(7); 1988; 531-533

Data relating to microbiological and sensory qualities of wrapped and unwrapped slices stored at 5 C and 25 C for up to 8 days has been presented. Irrespective of storage temp. Pseudomonas, Escherichia coli, Enterobacter and Micrococci comprised of dominant microflora. Growth was slower on wrapped watermelon than on unwrapped samples. Subjective ratings for colour, aroma, appearance, flavour and texture of unwrapped sample stored at 5 C decreased more rapidly compared to wrapped samples. Similarly dulling and darkness changed at a foster rate in unwrapped slice due to oxidative changes of pigments. CTD

CONFECTIONERY, STARCH AND SUGAR

1722 Carrillo (PJ), Gilbert (SG) and Daun (H). Starch/sucrose interactions by organic probe analysis. An inverse gas chromatography study. Journal of Food Science 54(1); 1989; 162-165

The effect of freeze drying of high amylopectin starch was determined with samples of starch dispersed in water with or without solubilized sucrose. The X-ray diffraction data showed that this treatment disrupted crystalline structures of amylopectin and sucrose exposing additional sites for water sorption. This was shown also by sorption isotherms of the starch alone. The Hylon 7-sucrose freeze-dried samples produced a greater effect on sorption than did the corresponding Amioca freeze-dried mixtures. Organic probe analysis of the starch and starch-sucrose mixtures indicated that high amylose starches were more reactive with polar organic probes than high amylopectin starches when freeze-dried. Untreated high amylopectin starches were more reactive with probes in agreement with the water sorption data for a more branched polymer. AS

1723 Rhim (JW), Nunes (RV), Jones (VA) and Swartzel (KR). Appearance of a kinetic compensation effect in the acid-catalyzed hydrolysis of disaccharides. Journal of Food Science 54(1); 1989; 222-223

A kinetic compensation effect was observed for acid-catalyzed hydrolysis of a series of disaccharides. Twelve data sets for acid hydrolysis of three disaccharides reported in the literature were analyzed and compensation parameters were determined. The results are well described by following empirical compensation expression: $\ln k_0 = AE_a + B$ with $A = 1.241$ and $B = -2.317$. The isokinetic temp. calculated from this compensation relationship was 132.4 C which was located beyond expt. temp. ranges. AS

Confectionery

1724 Burroughs (J). Ingredient effects of gelatin. Manufacturing Confectioner 68(11); 1988; 80-85

The article describes briefly the production specification and application of gelatin. It also describes the methods of wetting the gelatin, precautions during processing of the products and some new applications of gelatin. SYR

1725 Sleap (J). Formulation of pectin confections. Ingredient effects. Manufacturing Confectioner 68(11); 1988; 77-79

The article discusses the var. of pectin confections to demonstrate the differences between various types of pectin. The effective use of other ingredients and processing methods to obtain unique confections are also explained. Pectin is used in the manufacture of fruit jellies, enrobed jelly and as a gel former for aerated fruit products. Confectionery made with pectin can be texturally modified by the addition of other ingredients such as starch, gelatin, egg whites and fruit solids. SYR

1726 Zallie (J). New starches for gelling and non-gelling applications. Manufacturing Confectioner 68(11); 1988; 99-104

The article briefly describes applications of starches and new types of starches as gelling agents in confectionery. Some of the new introductions on the horizon will be targeted towards the continuous extrusion of starch-based confectionery an easy-to-cook starch that will make finished solids depositing of starch-based jelly contrus possible; and starch-based extenders or replacments for hydrocolloids. SYR

Chocolates

1727 Seguine (ES). Casson plastic viscosity and yield value. What they are and what they mean to the confectioner. Manufacturing Confectioner 68(11); 1988; 57-63

The article describes in detail the carbon plastic viscosity and yield value in relation to chocolate and the effect of variation in these properties on handling of chocolate in the plant. Viscosity and yield values are primarily influenced by the fat content, grind, ingredients and processing procedures used in making chocolate. Rheological properties of chocolate are not only of interest to the confectioner in enrobing and moulding, but also in the design of bulk chocolate handling systems. SYR

1728 Zak (DL). The development of chocolate flavour. Manufacturing Confectioner 68(11); 1988; 69-74

The article illustrates briefly about the chocolate flavour, its development and variations. Variations in growing regions, harvesting and fermentation techniques all contribute to flavour development. Roasting, conching and aging practices also contribute to flavour and its variation, which makes chocolate a universal flavour to satisfy a very diverse world. SYR

Jellies

1729 Thorz (M). Indirect steam cookers. Manufacturing Confectioner 68(11); 1988; 86-87

A brief comparison was made between older jet cooking system and indirect steam cooking for jelly manufacture. The jet cooker process gelatinizes either thin boiling or a combination of thin boiling and high amylose starch by direct injection of steam into the product steam. Indirect steam cookers, which are pumped through a coil for indirect heating can handle all types of colloids. A viable option for gum and jelly production is the indirect method of cooking; the static cooker is a versatile and energy efficient process that has been developed for continuous production of gums and jellies. SYR

Toffees

1730 Joshi (NS), Dave (RI), Patel (JR), Pandya (AJ) and Thakur (PN). Toffee. Indian Dairyman 41(3); 1989; 135-139

Toffees described include plain toffee, milk toffee, modified toffee and butter toffee; the quality requirement for toffee as specified by the Prevention of Food Adulteration Act of India is also given. The role of individual ingredients used in toffee has been described. KAR

Starch

1731 Endo (S), Karibe (S), Okada (K) and Nagao (S). Comparative studies on the quality characteristics for prime starch and starch tailings. Journal of Japanese Society of Food Science and Technology '(Nippon Shokuhin Kogyo Gakkaishi') 35(12); 1988; 813-822 (Ja).

Wheat starch suspensions isolated from six flour mill streams milled on a Buhler lab. mill were separated into upper layer (starch tailings) and lower layer (prime starch) fractions by centrifugation, and their qualitative and quantitative characteristics were compared between Australian Standard White Wheat (ASW) and Japanese domestic wheats. Large amounts of starch tailings were isolated both for the latter part of break and reduction flour mill streams. Starch tailings and prime starch differed in their amylose contents as analyzed by an amperometric iodine titration method. Prime starch isolated from ASW characterized in its most stable iodine-binding capacity for the changes of temp. during measurement as well as its lowers amylose content. Critical difference was observed for the digestibilities on sulphuric acid between starch tailings and prime starch. ASW starch showed intermediate digestibility as compared with that of Japaneses domestic wheat starches. There was little difference in the contents of P for five different kinds of wheat starches examined, although starch tailings showed somewhat higher values. AS

1732 Roper (H) and Koch (H). New carbohydrate derivatives from biotechnical and chemical processes. Starch/Starke 40(12); 1988; 453-464

Starch, its derivatives and hydrolysis products are well established as industrial products for the food and technical industries. More advanced products, based on starch, are available today, manufactured by biotechnical and chemical processes. They comprise a var. of monomeric compounds like polyols, hydroxycarboxylic acids, glycosides and their derivatives obtained by esterification, etherification and amination. In addition, interesting oligomeric and polymeric products are accessible, based on starch and its derivatives. Selected examples of these products are described as well as their respective production methods. For some products the chemicals synthesis will be compared with the fermentation route, analysing the relative advantages and disadvantages of both. The wide application potential of these new products is illustrated with reference to their use in different.industries, e.g, in the manufacturing and processing or resins, polymers, detergents, cosmetics, pharmaceuticals and processed foods.

Special emphasis will be given to the structural peculiarities of these carbohydrate derivatives, for examples chirality, which enables them to act as unique intermediates in the production of biologically active products. AS

BAKERY PRODUCTS

1733 Majumdar (SN). Requirement of quality raw materials for baking industry. Indian Miller 19(5); 1989; 10-

The author described the quality of wheat flour available to Indian baking industry which is more often infested or germinated. Identification of the flour quality by physical and chemical methods, instrumental methods for assessing the rheological quality of flour, relating the chemical comp. to baking quality; rate of addition of different additives like sugar, fat, and leavening agents and additives of nutritional value including milk, butter, and other milk products, eggs, etc. in baking are the aspects covered. Data on typical chemical and rheological characteristics of flours for bakery products and the quality parameters and values for shortenings biscuits have been tabulated. KAR

Cookies

1734 Halek (GW) and Levinson (JJ). Partitioning and absolute flavour threshold interactions of aliphatic and aromatic food packaging solvents in high-fat cookies. Journal of Food Science 54(1); 1989; 173-176

Partition coeff. and absolute flavour thresholds were determined in high-fat containing cookies for 11 organic compounds. They consisted of three structural and functional groups; three homologous aliphatic esters, four aromatic hydrocarbons, and four heterogeneous aliphatics. The two groups of structurally and functionally related compounds exhibited similar individual thresholds but the heterogenous group gave widely different values. Mixtures of these compounds at subthreshold and threshold concn. gave interactions that could be sorted into additive or independent categories according to group similarities. Application of numerical categorization formulas did not show consistent correspondence with word definitions or additivity of independence. AS

MILK AND DAIRY PRODUCTS

1735 Prasad (S) and Prasad (C). Phosphates in dairy and food industries. Indian Dairyman 41(3); 1989; 121-126

The chemical properties and functions of phosphates in various food products including cheese, baked foods, soft drinks and dairy products have been described. 19 compounds have been listed. KAR

1736 Rao (KVSS), Zangad (PN) and Mathur (BN). Convenience foods carry food industry to a new era. Indian Dairyman 41(3); 1989; 131-134

The role of convenience foods in the present day society, especially in the changing life style and the var. of convenience foods that are coming to the market as well as in hotel industry, and the need for convenience food by the Defence personnel are the aspects covered. KAR

Milk

1737 Jenq (W), Bassette (R) and Crang (RE). Effect of light and copper ions on volatile aldehydes of milk and milk fractions. Journal of Dairy Science 71(9); 1988; 2366-2372

Raw, lab.-pasteurized and plant-pasteurized homogenized milks were exposed to copper ions (5 p.p.m.), to sunlight or fluorescent light and the effects determined on the comp. of volatile aldehydes. The greatest change due to copper treatment was an increase in n-hexanal; acetaldehyde showed the least response in each of the source of milk. The responses were similar from all three sources of milk with lab.-pasteurized milk samples showing the greatest responses for each aldehyde analyzed. Similar milk samples exposed to sunlight also showed an increase in volatile aldehydes from all milk sources but with the greatest response being acetaldehyde and n-pentanal components. The milk fraction most susceptible to changes in the presence of light was neutralized whey, whereas resuspended cream was most susceptible to copper exposure. Overall, dialyzed whey appeared to be influenced more than other milk fractions by both light and copper ions. AS

1738 Lavigne (C), Zee (JA), Simard (RE) and Beliveau (B). Effect of processing and storage conditions on the fate of vitamins B , B , and C and on the shelf-life of goat's milk. Journal of Food Science 54(1); 1989; 30-34

Goat's milk was heat-processed under different time-temp. conditions of pasteurization and sterilization. Losses of thiamin, riboflavin and total vitamin C in HTST, Flash, and UHT were less than that by LTLT and autoclave. Also residual O in the milk affected the loss of total vitamin C during storage. A longer shelf-life of pasteurized milk was obtained with HTST, HTST overpasteurization, and Flash process; however, there was no significant difference between UHT and Autoclave sterilized products. From the above results, HTST pasteurization was considered the best process to preserve milk quality. AS

1739 McGuire (J). A predictive model for food particle interactions with contact surfaces. Journal of Food Science 54(1); 1989; 22-24

The protein adsorption rate from whole milk onto various surfaces was modeled as a function of contact surface tension, surface temp., and time. A new kinetic parameter related to the value of contact surface tension which corresponds to a minimal interaction between food components and the solid surface is introduced. This experimentally measurable parameter quantifies the influence of contact surface tension on the activation energy required for irreversible protein adsorption. In spite of its simplicity, the model adequately predicted initial adsorptive behaviour under steady flow conditions for a wide range of surface properties. AS

1740 Rama Raju (VV) and Kiran Kumar (M). Incidence of spore forming bacteria in milks heated to above 100 C. Journal of Food Science and Technology, India 25(6); 1988; 366-367

An investigation was undertaken to isolate and identify aerobic mesophilic and thermophilic spore forming bacteria from cow's and buffalo milk samples heat treated at 109 C for 15 min, 115 $Degree$ C for 10 min and 121 C for 5 min. Among mesophilic isolates B. subtilis was predominant, followed by B. licheniformis and B. cerues. Among thermophiles B. stearothermophilus was predominant followed by B. coagulans and B. licheniformis. AS

1741 Sowrapppa (K), Nageswara Rao (A) and Prasad (DS). Comparative economics of milk production in local and migrant farms. Indian Dairyman 41(3); 1989; 151-160

The survey was conducted in Siruguppa taluk of Bellary District in Karnataka State of India in 1986-87. The migrant farmers have come from outside the taluk and got settled with dairying as one of their enterprise. The survey included small, medium and large farmers and the dairy animals included in the survey are buffaloes and cows. The survey included, type of milch cattle possessed by local and migrant farmers, concentrate feeding pattern, maintenance cost, milk production consumption and disposal pattern of milk and cost of production of milk. KAR

Milk products

1742 Garg (SK). Hazards of enterococci in milk products. Indian Dairyman 41(3); 1989; 141-143

The small note describes about the enterococci, its occurrence, distribution, incidence in milk and milk products, heat resistance, antibiotic sensitivity and public health significance. KAR

Cheese

1743 Ha (YL), Grimm (NK) and Pariza (MW). Newley recognized anticarcinogenic fatty acids. Identification and quantification in natural and processed cheeses. Journal of Agricultural and Food Chemistry 37(1); 1989; 75-81

1744 Heiland (WK), Konstance (RP), Flanagan (JF), Craig (JCJr) and Holsinger (VH). Design and operation of an experimental cheese processor. Journal of Dairy Science 71(9); 1988; 2388-2394

The design and operating characteristics of a horizontal cheese cooker, which has a max. capacity of 4 kg raw material per batch, are described. Considerations for processor design included comparability of experimental results with large commercial units, limitation of batch size to reduce raw material required, accommodation of a wide range of process variables, "sanitary" design, ease of operation, ease and speed of cleaning, and pressurization if desired. A screw speed of 70 r.p.m. cook temp. of 75 to 82 C, and total residence time of 4 min produced a process cheese of good melting and slicing characteristics. AS

1745 Tong (PS), Barbano (DM) and Jordan (WK). Permeat flux during ultrafiltration of whey. Influence of milk coagulant used for cheese manufacture. Journal of Dairy Science 71(9); 1988; 2342-2348

Coagulants of milk from calf rennet, Mucer pusillus and Mucer miehei were compared for permeate flux using ultrafiltration system. Highest permeate flux was obtained from the whey produced by M. pusillus protease and lowest premeat flux from that of calf rennet. M. miehei produced permeat flux performance intermediate to M. pusillus and calf rennet. There was no difference in the gross composition of various wheys. JSS

Cheddar cheese

1746 Bhowmik (T) and Math (EH). Protease and peptidase activity of Micrococcus species. Journal of Dairy Science 71(9); 1988; 2358-2365

Nine different strains or sp. of Micrococci were examined for intracellular protease and peptidase activity. Highest activities of leucine, alanine, and methionine aminopeptidases and proline iminopeptidase were found in Micrococcus sp. ATCC 398. Lysine aminopeptidase and dipeptidase activities were max. in Micrococcus freudenreicbii ATCC 407. Highest intracellular protease activity appeared in Micrococcus sp. LL3 isolated from Cheddar cheese. All strains except Micrococcus sp. ATCC 398 preferentially hydrolyzed the $Beta$-casein component during growth in skim milk at 30 C, and after longer incubation whole casein (Alpha and Beta) was completely hydrolyzed. Micrococcus Sp. ATCC 398 failed to grow in skim milk under our experimental conditions. This pattern of proteolysis also was observed when skim milk was incubated with cell free extracts of all micrococci tested as well as during growth of Micrococcus caseolyticus ATCC 13548 in ultrafiltered milk (five-fold concn.). AS

1747 Mistry (VV) and Kosikowski (FV). Yield and quality of Cheddar cheese from high somatic cell milk supplemented with retentate to varying concentrations of directly ultrafiltered. Journal of Dairy Science. 71(9); 1988; 2333-2341

High somatic cell milk with a mean cell count of 2,235,000/ml was supplemented to 1.25:1 to 1.88:1 total protein with approx. 5.5:1 low somatic cell whole milk retentate of UF. Curd formation time of cheese milk decreased with increasing concn. of SCC. Supplemented milk conc. to 1.65:1 and 1.88:1 total protein displayed normal curd formation times: 34 and 31 min, resp. Also, cheese made from these mixtures had normal moisture, whereas the remaining cheeses had higher than normal moisture. Supplementation to 1.65:1 and 1.88:1 total protein increased cheese yield by 9.67% and 11.38% resp., and produced excellent quality cheese after 2 m at 10 C. Direct UF of high SCC milk to 1.84:1 total protein improved cheese quality and increased yield over control milk cheeses but not to the same high level attained with retentate supplementation. AS

Milk powder

Skim milk powder

1748 Arora (KL). Quality of skim milk powder manufactured in India. Indian Dairyman 41(3); 1989; 169-171

Market samples of skim milk powder (spray dried and roller dried) have been analysed for chemical composition and microbiological quality and the data are tabulated. There are some samples which did not conform to Indian Standards Specification in chemical composition and microbiological quality. KAR

Paneer

1749 Ghodekar (DR). Factors affecting quality of paneer. Indian Dairyman 41(3); 1989; 161-164

Paneer is an acid coagulated milk product of India. Types of milk suitable for paneer preparation, fat content of the milk used for paneer preparation, heat treatment of milk for paneer preparation, type of coagulants used, yield of paneer from milk and the manufacturing aspects are mentioned. Moisture content of panner, and its possible contamination have also been indicated. KAR

Rasogolla

1750 Sen (DC). Rasogolla - a chemical Indian milk sweetmeat. Indian Dairyman 41(3); 1989; 145-150

Rasogolla (Sugar syrup soaked sweet preparation from coagulated milk) is prepared extensively in India under cottage scale. Method of preparation and its canning are described along with their factor affecting rasogolla quality, modification of buffalo milk for rasogolla preparation, and chemical and microbiological quality of rasogolla. KAR

Whey

1751 Gupta (VK) and Mathur (BN). Current trends in whey utilization. Indian Dairyman 41(3); 1989; 165-167

Current status of whey production and its utilization; condensing and drying of whey; demineralization of whey for use in infant formulae, preparation of whey drinks by mixing with fruit juices, production of lactose; ultrafiltration of whey to recover soluble whey protein conc. are the aspects covered in this article. KAR

Whey protein concentrate

1752 Kim (S-H), Morr (CV), Seo (A) and Surak (JG). Effect of whey pretreatment on composition and functional properties of whey protein concentrate. Journal of Food Science 54(1); 1989; 25-29

The effect of pretreatment upon the comp. and physicochemical and functional properties of whey, ultrafiltration (UF) retentate and freeze-dried and spray-dried whey protein conc. (WPC) was investigated. Pretreatment was by cooling cheese whey to 0-5 C, adding calcium chloride, adjusting to pH 7.3, warming to 50 C, and removing the insoluble precipitate that formed by centrifugation or decantation. UF permeation flux rate of pretreated whey was about double that for control whey. Pretreated whey was essentially turbidity free, contained 85% less milkfat, 37% more Ca and 40% less P than whey. Pretreated whey WPC proteins were slightly more soluble at pH 3, but less functional for emulsification than whey WPC proteins. Neither whey WPC proteins nor pretreated whey WPC proteins was functional for foaming at 6% protein concn. AS

Whey protein isolate

1753 Shimada (K) and Cheftel (JC). Sulphydryl group/disulphide bond interchange reactions during heat-induced gelation of whey protein isolate. Journal of Agricultural and Food Chemistry 37(1); 1989; 161-168

Zabadi

1754 El-Neshawy (AA) and El-Shafie (NM). Quality of Zabadi made from cow's milk fortified with whey and soy proteins. Nahrung 32(10); 1988; 939-943

Zabadi was made from cow's milk incorporated with 10, 20, and 30% whey protein conc. (WPC) or 2, 4 and 6% soy protein conc (SPC). Addition of WPC up to 20% or SPC up to 4% to cow's milk improved the consistency and flavour of the resultant Zabadi and also increased its total solids, total protein, acidity, total volatile fatty acids and soluble nitrogen contents. When WPC was added to cow's milk at a level of 20% together with SPC at a level of 2% the best quality zabadi was obtained. AS

Milk proteins

1755 Haque (Z) and Kinsella (JE). Emulsifying properties of food proteins Development of a standardized emulsification method. Journal of Food Science 54(1); 1989; 39-44

A recirculating value-homogenizer was used to compare the emulsifying properties of bovine serum albumin and milk proteins. The energy input per unit vol. was directly obtained from the mean max. valve head pressure per stroke. The mean max. velocity of the emulsion in the value head was 83 m sec^{-1} during a valve opening time of 150 x 10^{-3} sec reflecting a large velocity gradient per stroke of 4.2 x 10^{-6} m^{3} . The method detected changes in the emulsifying activity of proteins resulting from chemical modification, and from process or environmental factors, e.g., ionic strength. The value-head pressure profile was used to compare the fluidity of the emulsions at different levels of energy input per unit vol. (E) and an apparent viscosity index (AVI) has been proposed. AS

MEAT AND POULTRY

Meat

1756 Bachhil (VN) and Jaiswal (TN). Bacillus cereus in meats. Incidence prevalence and enterotoxigenicity. Journal of Food Science and Technology, India 25(6); 1988; 371-372

An investigation was undertaken to study the incidence and enterotoxigenicity of B. cereus in meats. It was observed that 35% fresh buffalo meats, 100% kabab and 30% of the curry samples harboured 9.65 x 10^{4} , 1.07 x 10^{3} and 6.4 x 10^{2} B. cereus/g resp. Though the levels of B. cereus population decreased in cooked meats, the prevalence (% positive samples) increased. Bacillus cereus counts varied between 1.10 x 10^{2} -10^{4} /g in cooked meats viz. kabab and curry. Guinea pig skin response of B. cereus cell free filtrates revealed that 90% of the strains were enterotoxigenic. On the whole, 30% of the fresh buffalo meat and 60% of the cooked meats (kabab and curry) harboured enterotoxigenic B. cereus. AS

Beef

1757 Powell (VH) and Cain (BP). A hot water decontamination system for beef sides. CSIRO Food Research Quarterly 47(4); 1987; 79-84

1758 Stites (CR), Mckeith (FK), Bechtel (PJ) and Carr (TR). Palatability and storage characteristics of precooked beef roasts. Journal of Food Science 54(1); 1989; 3-6

1759 Unda (JR), Molins (RA) and Zamojcin (CA). Sanitization of fresh rib eye steaks with chlorine dioxide-generating binary systems. Journal of Food Science 54(1); 1989; 7-10

Beef patties

1760 Mendenhall (VT). Effect of pH and total pigment concentration on the internal colour of cooked ground beef patties. Journal of Food Science 54(1); 1989; 1-2

Bovines

1761 Ringkob (TP), Russell (RL), Swartz (DR), Pagel (LA), Hoenecke (ME) and Marsh (BB). Bilateral temperature asymmetry in the loin of the bovine carcass. Journal of Food Science 54(1); 1989; 11-14

Mutton

Goat

1762 Reddy (KS) and Mandokhot (UV). Studies on sulphur dioxide treatment of minced goat meat. II. Effect of spoilage bacteria and some food pathogens. Journal of Food Science and Technology, India 25(6); 1988; 345-348

The effect of sulphur dioxide on functional groups of organisms and some food pathogens was studied. Lactobacilli were affected to the max. extent followed by coliforms, faecal coli, streptococci and salt tolerants (7.5% NaCl). Amongst the pathogens studied, S. enteritidis and Y. enterocolitica were killed. S. aureus, though found initially to undergo bactericidal action, appeared to overcome the determinental action of sulphur dioxide. AS

Sheep

1763 Mahendrakar (NS), Dani (NP), Ramesh (BS) and Amla (BL). Effect of postmortem conditioning treatments to sheep carcasses on some biophysical characteristics of muscles. Journal of Food Science and Technology, India 25(6); 1988; 340-344

Female sheep (age: 4-5 y) of Bannur breed were sacrificed and carcasses subjected to postmortem conditioning treatments, viz., Achilles tendon suspension (conventional) at 2.3 C for 24 h (C_1) or pelvic suspension at RT (26 plus or minus 2 C) for 7 h followed by chilling at 2-3 C for 17 h (C_2). The data collected on SM and ST muscles from conditioned (C_1 or C_2) carcasses were compared with those obtained on fresh (F) muscles dissected out within 1h postmortem. The results indicated that conventional Achilles tendon suspension (under chilling conditions) exerts different restraining influence on thigh muscles permitting contraction in SM and stretching in ST muscles whereas pelvic suspension (under delayed chilling condition) streteched both muscles, effect being more in ST than in SM muscle. Pre-rigor muscles when cooked shortened most and cold contracted muscles least and stretched muscles shortened more on cooking than (cold) contracted ones; the interaction conditioning x cooking was highly significant ($P < 0.01$). Pressure cooking induced greater thermal shrinkage than cooking without pressure. Contraction or stretching of muscles on account of carcass suspension posture had no significant ($P > 0.05$) effect on cooking loss and WHC of muscles. AS

Pork

1764 Mendonca (AF), Molins (RA), Kraft (AA) and Walker (HW). Microbiological, chemical and physical changes in fresh, vacuum-packaged pork treated with organic acids and salts. Journal of Food Science 54(1); 1989; 18-21

1765 Novakofski (J), Park (S), Bechtel (PJ) and Mckeith (FK). Composition of cooked pork chops. Effect of removing subcutaneous fat before cooking. Journal of Food Science 54(1); 1989; 15-17

1766 Stites (CR), Mckeith (FK), Bechtel (PJ) and Novakofski (J). Processing and sensory properties of round pork bacon. Journal of Food Science 54(1); 1989; 214-215

Poultry

1767 Schmitt (RE), Hass (J) and Amado (R). Determination of biogenic amines by RP-HPLC for monitoring microbial spoilage of poultry. Zeitschrift fur Lebensmittel-Untersuchung und -Forschung 187; 1988; 121-124

A simple high-performance liquid chromatographic (HPLC) analysis is described for the detn. of biogenic amines in broiler carcasses. The clean-up procedure consists of an extraction with 0.6 M-perchloric acid, formation of dansyl derivatives, separation by a RP-18 column and UV detection at 254 nm. Within 7 min eight amines could be separated. The quantitative detn. of spermidine and spermine requires an additional ion-exchange clean-up with Amberlite CG 50 after the extraction. This procedure give recoveries of 82%-96% with detection limits of 0.2-0.5 µg/g of broiler skin. Putrescine and cadaverine are good indicators for the onset of spoilage of poultry carcasses, since both amines could be detected at total colony counts of 10^5 cfu/cm^2 and their concn. increases rapidly with advancing decomposition. AS

Chickens

1768 Anand (SK), Pandey (NK), Mahapatra (CM) and Verma (SS). Sampling methods for determining the microbial counts of frozen chicken. Indian Journal of Poultry Science 23(3); 1988; 196-200

Frozen chicken carcasses were analysed microbiologically by three methods. After overnight thawing at 7 C samples were taken (1) by swabbing 2 cm^2 breast skin area, (ii) by excising one gram neck skin flap and (iii) drip fluid. They were tested for total plate counts, (Salmonella, Staphylococci, total coliforms, enterococci, and yeast and moulds. Counts significantly differed among these methods of sampling. Skin maceration gave significantly higher counts than swabbing. Drip samples mostly indicated still lower counts. Suitability of skin maceration technique for sampling frozen chicken is emphasised. AS

1769 Wolm (G), Schliemann (J) and Schrodter (R). Chicken flavour-formation, composition and production. Part 3. Production. Nahrung 32(10); 1988; 981-988 (De).

Similar to the formation of natural chicken flavour its simulation also takes place on the basis of Maillard reaction and fat degradation. In this connection the choice of suitable reaction components is as important as the conversion of the conditions of boiling, roasting and grilling processes into technological parameters permitting a large scale production of simulates. Closing this set of publications the present paper deals with the production of chicken-like flavour conc. excluding chicken extracts. AS

Products

Eggs

1770 Chidha (SS), Chhikara (OP) and Deswal (KK). A study of production, marketable surplus and price behaviour of eggs in Gurgaon district of Haryana State. Indian Journal of Poultry Science 23(3); 1988; 222-225

The study revealed that the marketable surplus accounts for about 77.01% of total egg production. The breakage and home consumption was highest (24.35%) on small sized poultry farms and lowest (21.35%) on large sized poultry farms. The egg production increased progressively from the month of July to January. The linear model explained about 82.31% of the variation in egg prices. The rise in prices of eggs figured out to be about Rs. 2.83 per hundred eggs per yr. The seasonal index for egg prices was highest in December (118.8) followed by January (117.8) and lowest in May (81.5). The coeff. of price variation was highest (15.94%) in the yr 1983; between 1979 and 1983. AS

1771 Herald (TS), Osorio (FA) and Smith (DM). Rheological properties of pasteurized liquid whole egg during frozen storage. Journal of Food Science 54(1); 1989; 35-38

Effects of pasteurization and frozen storage on the rheological behaviour of liquid whole egg (LWE) were studied using a cone and plate viscometer. Homogenized LWE control and LWE heated at 60 C, 64 C or 68 C for 3.5 min were evaluated during 80 days storage at -24 C. Thixotropic behaviour was observed in all frozen samples. Apparent viscosity increased with pasteurization and frozen storage. Unpasteurized LWE exhibited Newtonian behaviour throughout storage. Pasteurized LWE flow properties changed from Newtonian to Thngham Plastic during storage. Identification of rheological parameters will help understand the mol. changes that occur during the processing and storage of LWE and help processors monitor LWE quality. AS

Egg powder

1772 Satyanarayana Rao (TS) and Murali (HS). Effect of moisture on solubility, free fatty acid content and $Beta$-carotene of spray-dried, freeze-dried and foam-mat-dried egg powder during storage. Journal of Food Science and Technology, India 25(6); 1988; 368-370

Spray-dried, foam-mat-dried and freeze-dried egg powders with different moisture levels (2-12%) were stored for 60 days at 19-25 C and 37 C. There was a loss of solubility, an increase in free fatty acids content and loss of carotene depending upon storage temp. On the basis of these changes, it is suggested that about 2% moisture would be optimum for storage of egg powder for 60 days. AS

Egg white

1773 Leahey (JM) and Thompson (DB). Effect of heat processing of dried egg white on in vitro iron bioavailability. Journal of Food Science 54(1); 1989; 154-158

Egg white (EW) was desugared, adjusted to either pH 7 or pH 9, and freeze-dried. Portions were held at 25, 50, 60, 70, or 80 C for 1 wk. In vitro iron bioavailability (IVIB) was estimated by the method of Kane and Miller (1984) and no differences in IVIB were observed due to EW pH. IVIB of EW held at 50, 60, or 70 C was not different $(P > 0.05)$ than that of EW held at 25 C 19.87% dialyzable iron (DI); only the 80 C treatment led to IVIB lower (6.76% DI, $P < 0.05$) than the 25 C control. Differential scanning calorimetery and nondissociating electrophoresis showed that native protein structure, including that of the iron binding protein ovotransferrin, was maintained after the 70 C treatment but not after the 80 C treatment. AS

1774 Ziegler (GR) and Rizvi (SSH). Determination of cross-link density in egg white gels from stress relaxation data. Journal of Food Science 54(1); 1989; 218-219

The concn. of permanent cross-links in egg white gels was determined using stress relaxation expt. and equations derived from the theory of rubber elasticity. Cross-link densities of 1.2-1.3 covalent cross-links/molecule were observed. The concn. of covalent cross-links, most likely disulphide bonds, was only slightly higher for gels formed in water as compared to those formed in 0.6M NaCl-0.2M phosphate buffer at pH 6.0. These results differ from the 3-4 cross-links/mol. previously reported for ovalbumin gels in 0.6M urea. AS

Egg yolks

1775 Yang (SS) and Cotterill (OJ). Physical and functional properties of 10% salted egg yolk in mayonnaise. Journal of Food Science 54(1); 1989; 210-213

Stability of mayonnaise prepared from 10% salted egg yolk was decreased by freezing, spray-drying or freeze-drying for the yolk. Storage of salted yolk for 90 days further decreased stability of mayonnaise made from freeze-dried yolk but not that made from frozen spray-dried yolk. Stiffness of mayonnaise was increased by pasteurization but stability was increased only at the lesser of two heat treatments. Size of fat globules in the mayonnaise was inversely related to mayonnaise stability. AS

SEAFOODS

1776 Desrosiers (MF). Gamma -irradiated seafoods. Identification and dosimetry by electron paramagnetic resonance spectroscopy. Journal of

Agricultural and Food Chemistry 37(1); 1989; 96-100

1777 No (HK) and Meyers (SP). Recovery of amino acids from seafood processing waste water with a dual chitosan-based ligand-exchange system. Journal of Food Science 54(1); 1989; 60-62

Crawfish chitosan, prepared from crawfish shell chitin, was demonstrated to be an effective ligand-exchange column material for recovery of amino acids from seafood processing waste water. In comparison with commerical chitosan, crawfish, chitosan, loaded with copper or amino copper, showed higher recovery rates of amino acids. Recovery from amino copper-crawfish chitosan columns was pH dependent, with reduction at higher pH values. Eluate was completely free of copper ions when treated with a second crawfish chitosan column. The amino acids recovered by this treatment have potential application as seafood flavours in terms of their sensory attributes. AS

Molluscs

Clams

1778 Reddy (NR), Flick (GJ), Dupuy (HP) and Boardman (GD). Characterization and utilization of dehydrated wash waters from clam processing plants as flavouring agents. Journal of Food Science 54(1); 1989; 55-59

Wash water (WW) samples were collected from three clam plants (A, B, and C) during various processing stages, spray- and freeze-dried, analyzed for proximate comp., mineral and amino acid content and volatile flavour profiles. Selected WW samples were evaluated for possible incorporation into clam dips in place of clam meat and juice. Glucose accounted for more than 75% of total carbohydrate in selected WW samples. Glutamic acid, aspartic acid, glycine and alanine were the major amino acids in some of the selected WW samples may be added at 1.75% (w/w) to clam dip in place of clam meat and juice without any significant changes in overall acceptability, taste, odour, texture and appearance. AS

Oysters

1779 Ikuta (K) and Morikawa (A). Distribution of heavy metals in soft bodies and shell cavity fluids of Crassostrea gigas. Bulletin of the Japanese Society of Scientific Fisheries ('Nihon Suisan Gakkai-shi') 54(10); 1988; 1811-1816

A number of oysters were collected at the intertidal zone and kept in ice boxes, from which the specimens were serially picked up over 17 times at the interval of 6 h for 96 h. Cu, Zn, Fe, Mn and Cd contents in soft bodies and shell cavity fluids were determined. At the same time, N contents in shell cavity fluids were also determined. Regression and correlation coeff. between the metal and N contents and the serial times were not significant. Namely, the contents fluctuated independently without regard to the elapsed time. This proved that the preserving method was adequate to confine the metabolic activity of the specimen oysters. Of the total absolute amounts of Cu and Zn in soft bodies and shell cavity fluids, more than 99% distributed in soft bodies, and consequently, less than 1% of the two metals existed in the fluids. Cd more than 98%, Mn more than 97% and Fe more than 96% distributed in soft bodies. Although the levels of metal contents in shell cavity fluid were clearly less than those in soft bodies, the levels in the fluids were surprisingly higher than those in normal sea waters. Taking into account the fluctuations of the heavy metal and the N contents in the shell cavity fluids mentioned above: it was suggested that the pre-concn. in shell cavity fluid through the uptake process of heavy metals is the main factor for the high heavy metal contents in the fluids. Since, for specimens frozen deeply with shell values, heavy metal contents in shell cavity fluid have been determined for a long time together with those in soft bodies, heavy metal contents of lamellibranchs are estimated somewhat higher than those obtained from fresh specimens. AS

Squids

1780 Krzynowek (J), D'Entremont (DL) and Murphy (J). Proximate composition and fatty acid and cholesterol content of squid, Loligo pealei and Illex illecebrosus. Journal of Food Science 54(1); 1989; 45-48

The wide range of cholesterol values given in the literature for Loligo pealei and Illex illecebrosus is confusing to people who are designing low cholesterol diets for health purposes. These sp. were analyzed for proximate composition, fatty acid content, and cholesterol content in order to provide information to consumers and health care professionals. A sampling of both sp. of squid over a 2 yr period revealed that cholesterol values ranged from about 110 mg up to 450 mg/100 g raw tissue with no apparent correlation with season or location of catch. The wide range of values, therefore, seems to reflect natural occurences. Omega-3 fatty acids make up over 50% of the total fatty acids, but these squid, because they are low in fat (about 1.5%), contribute only about 0.5g of these fatty acids per 100g in the diet. AS

Prawns

1781 Whitfield (FB), Last (JH), Shaw (KJ) and Tindale (CR). 2, 6 Dibromophenol. The cause of an iodoform-like off-flavour in some Australian crustaceae. Journal of the Science of Food and Agriculture 46(1); 1988; 29-42

2, 6 Dibromophenol was identified as the cause of an iodoform-like off-flavour in the prawns. In prawn meat the concn of this compared ranged from 60 $\mu g\ kg^{-1}$ to 200 $\mu g\ kg^{-1}$ Hardly and processing procedures which could reduce the severity of the off-flavour in susceptible sp. were described. UJSPR.

Fish

1782 Sano (T), Noguchi (SF), Matsumoto (JJ) and Tsuchiya (T). Dynamic viscoelastic behaviour of F-actin on heating. Journal of Food Science 54(1); 1989; 231-232

Although a relatively large amount of actin is contained in myofibril, the role of F-actin in the thermal gelation of muscle proteins has been little studied. The dynamic viscoelastic behaviour of F-actin on heating to clarify the role of F-actin in the thermal gelation is investigated. F-actin did not form an elastic gel on heating but did turn into a curdy matter. In addition, F-actin showed no development either of the storage modulus or the loss modulus during a rise in temp. These results suggest that F-actin negatively affects the gel formation of fish muscle proteins. AS

1783 Toyohara (H) and Shimizu (Y). Relation of the rigor mortis of fish body and the texture of the muscle. Bulletin of the Japanese Society of Scientific Fisheries ('Nihon Suisan Gakkai-shi') 54(10); 1988; 1795-1798

The changes in the rigor mortis of fish body and the breaking strength of the muscle were compared using tilapia. During ice storage, the rigor index measured by the modified Cutting's method reached max. 9 h after death and the full rigor lasted for 4 days, while the breaking strength of the muscle became max. 3 h after death, then decreased continuously for 24 h and then did not change. This result strongly suggested that both changes should be clearly distinguished. Therefore, it is proposed that the change of the apparent rigor of fish body is expressed as "pre-in, and post-rigor", and that the change of the texture of fish muscle is expressed as "though and weak". The weakening of muscle may be explained not as a proteolytic breakdown of myofibrils but as a decomposition of the muscle structure, because no proteolytic reaction was detected by the examination of TCA-soluble material and by the analysis on SDS-PAGE. AS

Cod

1784 Pellegrino (C), Giaccone (V) and Ponozoni (N). Microbiological analysis of ready-to-use cod fish. 2nd. Industrie Alimentari 27(262); 1988; 629-633 (It).

This paper reports preparation of stockfish, which consists of slices of re-hydrated vacuum packed and frozen stockfish. This product is obtained through various successive phases which have been checked by us. Bacteriological tests have been carried out to show if there is a critical point in the various manufacturing practices, and to determine the degree of the finished product's quality. 9 samples of dried stockfish, 12 samples drawn after the first re-hydration treatment, and 35 samples of the frozen product were examined. The microbial flora of the dried product was found to be very limited (between log. 2 and log. 4) while the count obtained on the re-hydrated stockfish proved to be higher (between log. 5 and log. 7). Tests carried out on the frozen product gave the same results as obtained on the dried product. Despite the fact that the re-hydration process of stockfish causes a considerable microbial pollution, the subsequent freezing process (specifically liquid nitrogen refrigeration) represent a good technique which guarantees for the acceptability of the finished product's quality. AS

Sturgeon

1785 Price (RJ), Hung (SSO), Conte (FS) and Strange (EM). Processing yields and proximate composition of cultured white sturgeon (Acipenser transmontanus). Journal of Food Science 54(1); 1989; 216-217

Cultured white sturgeon, 10-43 months old, were processed into dressed fish, fillets, and steaks. Edible portions from four age classes were analyzed for proximate comp. Round wt. yields were: eviscerated, 85-96%; dressed 53-65%; steaked, 61-74%; skin-on fillets, 54-61%; and skinless fillets, 32-50%. The proximate comp. of the sturgeon averaged 77.3% moisture, 18.2% protein, 3.4% lipid, and 1.2% ash. Protein levels in 10-13 month-old fish were significantly lower than in 32-34 and 43-months old sturgeon. Lipid levels in 10-13 months old fish, and ash levels in 32-34 months-old sturgeon, were significantly higher than in other age classes. AS

Tilapia

1786 Park (JW) and Lanier (TC). Scanning calorimetric behavior of tilapia myosin and actin adue to processing of muscle and protein purification. Journal of Food Science 54(1); 1989; 49-51

The thermal behaviour of tilapia muscle proteins was investigated by differential scanning calorimetry at various stages in the processing of surimi and during purification of myosin and actin. A shift in the thermal transition of actin to lower temp. was observed and the enthalpies of denaturation for both actin and myosin decreased with further processing. Salt addition also induced shifts in denaturation transitions to lower temp. and decreased enthalpies of denaturation. AS

1787 Wicker (L), Lanier (TC), Knopp (JA) and Hamann (DD). Influence of various salts on heat-induced ANS fluorescence and rigidity development of tilapia (Serotherodon aureus) myosin. Journal of Agricultural and Food Chemistry 37(1); 1989; 18-22

Whitefish

1788 Cuppett (SL), Gray (JI), Booren (AM), Price (JF) and Stachiw (MA). Effect of processing variables on lipid stability in smoked great lakes whitefish. Journal of Food Science 54(1); 1989; 52-54

Lipid stability of smoked Great Lakes whitefish was affected by salt level, presence of nitrite, and the type (wood vs liquid) and level of smoking used during processing. The addition of salt significantly ($P < 0.01$) increased the levels of oxidation. However, of the salt containing samples, the 4% salt (water-phase) were the least oxidized. Wood smoke exhibited significantly ($P < 0.01$) greater antioxidant activity than any of the levels of liquid smoke tested. The addition of nitrite to smoked whitefish significantly ($P < 0.01$) reduced the level of oxidation, and did not result in the formation of N-nitroso compounds. AS

Products

Fish

1789 Teeny (FM). Simple method for preparring bone-free ash from fishery products analyzed for mineral content. Journal of Agricultural and Food Chemistry 37(1); 1989; 100-104

A simple method was developed for preparing bone-free ash from samples of canned and fresh fish products. The technique employs deionized distilled water to remove bits of bone from the sample ash prior to mineral detn. The addition of bone to the flesh prior to ashing had minimal effect upon the mineral level of the flesh. AS

Fish

Fermented fish products

1790 Sarojnalini (C) and Vishwanath Singh (W). Composition and digestibility of fermented fish foods of Manipur. Journal of Food Science and Technology, India 25(6); 1988; 349-351

The chem. comp., total bacterial counts and digestibility of Hentak (H) and Ngari (N), two fermented fish foods consumed in Manípur were determined. The comp. of Hentak and Ngari were: cholesterol, 2.67 and 8.37 mg/g; Ca, 12.60 and 6.88 mg/g; Fe, 1.29 and 0.51 mg/g; and total viable bacterial counts 4.8 x 10^{8} and 5.0 x 10^{7} cells/g resp. Pepsin action for 2 h followed by trypsin action for 20 h in vitro digested 71.89% and 82.28% of total protein, liberating 5 and 4 essential amino acids from Hentak and Ngari resp. Hentak appears to be a better food in view of its higher Ca, Fe, essential amino acids, lipids and lower cholesterol content. AS

Kamaboko

1791 Niwa (E), Chen (E-S), Wang (T-T), Konoh (S) and Nakayana (T). Extraordinariness in the temperature-dependence of physical parameters of kamaboko. Bulletin of the Japanese Society of Scientific Fisheries ('Nihon Suisan Gakkai-shi') 54(10); 1988; 1789-1793

The effect of temp. on the different physical parameters of kamaboko which is known as an entropy elastic body, has been investigated. The contractile force of the elongated kamaboko (prepared from the Allaska Pollack frozen surimi) and the expansible force of the compressed one increased with the rise in temp. upto 60 C. The elongation and the compression forces of the kamaboko decreased upto 80 C at each strain, the breaking forçe and the breaking strain increased upto 60 C for both elongation and compression, but decreased above this temp. Based on the above results and earlier findings by the authors, the extraordinary temp. dependent nature of the physical parameters of the kamaboko has been discussed in relation to the protein structure. SGB

PROTEIN FOODS

Nil

ALCOHOLIC AND NON-ALCOHOLIC BEVERAGES

1792 Dikinson (E), Narhan (SK) and Stainsby (G). Stability of cream liqueurs containing low-molecular weight surfactants. Journal of Food Science 54(1); 1989; 77-81

The effect of adding low-mol. wt. surfactants, commercial glycerol monostearate (GMS) or sodium stearyl lactylate (SSL), on the stability of simulated cream liuqeurs (dairy based oil-in-water emulsions containing alcohol) was investigated. The presence of 0.4-0.5 wt % GMS or SSL led to a substantial reduction in creaming at ambient temp. as well as a longer shelf-life at 45 C. A protein analysis of the aqueous phase after emulsion centrifugation showed that added GMS or SSL displaced a significant proportion of caseinate from the surface of the emulsion droplets. Improved stability with respect to creaming appeared to be associated with a change in bulk rheological properties of the emulsion, probably arising from complex formation between low-mol. wt. emulsifier and caseinate, both in bulk aqueous solution and at the surface of the fat droplets. AS

Alcoholic beverages

Beer

1793 Alvarez (R), Fernandez Haya (E), Delgado (MA) and Ferrete (FJ). Vicinal diketones in beer. Part I. Journal of the Institute of Brewing 95(1); 1989; 21-23

A rapid and reliable analytical method for the detn. of diacetyl and other vicinal diketones in beer is described. The modified method of the EBC procedure involves the collection of the diacetyl distilled from the beer in a solution of o-phenylenediamine in 4 M hydrochloric acid. Details of the experimental procedure are given. NGM

1794 Dale (CJ) and Young (TW). Fractionation of small peptides from beer. Journal of the Institute of Brewing 95(1); 1989; 35-41

Low mol. wt. (< 1000 MW) peptides were isolated from beer by hallow fibre filteration followed by column chromatography using the cell matrix sephadex LH 20. By this procedure low mol. wt. peptides almost free from other nitrogenous materials were isolated. The beer prepared by barley malt alone contained more peptides than that prepared with 30% maize grits as adjuncts. HPLC reverse phase analysis of small peptide fractions showed superior resolution of individual components compared to paper electrophoresis and paper chromatography and demonstrated the presence of many peptide components. Acid hydrolysis and amino acid analysis of small peptides revealed the presence of glutamic acid/glutamine as the principle amino acid. NGM

1795 Delgado (MA), Fernandez (E) and Alvarez (R). Vicinal diketones in beer. Part III. Influence of sulphur dioxide in the determination of diacetyl in beer. Journal of the Institute of Brewing 95(1); 1989; 25-27

1796 Van Heerden (IV). The nutritive content of African beers brewed with maize grits or sorghum adjunct. Journal of the Institute of Brewing 95(1); 1989; 17-20

Sorghum beer samples were brewed in a pilot plant operation using either sorghum grain or maize grits as starchy adjunct in order that the nutritive content of the beers could be compared. Significantly higher ethanol, thiamin, nicotinic acid, ash, phytate, Zn, Cu, Mn, Fe, Mg, K and P concn. were found in beers brewed with sorghum adjunct. Sorghum adjunct beers can therefore make a greater contribution to the nutritional requirements of the Southern African beer drinker than beers brewed with maize grits. The results obtained suggest that the use of sorghum adjunct in the brewing of sorghum beer should be encouraged for economic and dietary reasons. AS

Wines

1797 Koniger (M), Engelhardt (G), Schmitt (A) and Wallnofer (PR). Determination of ethylenethiourea in white wine. Deutsche Lebensmittel-Rundschau 85(1); 1989; 5-7 (De).

Ethylenethiourea (ETU) was determined in white wine by HPLC after an easy cleanup process using an Extrelut column. Recoveries range from 86 to 92%. The limit of detection is 0,005 p.p.m. Among 31 samples of experimental wine resulting from vine plots treated with ethylenebisdithiocarbamate (EBDC) fungicides 21 samples show no or only traces of ETU residues. The highest level determined was lower than 0.04 p.p.m. AS

Non-alcoholic beverages

Coffee

1798 Rathbone (EB), Butters (RW), Cookson (D) and Robinson (JL). Chirality of 2-(4-methoxyphenoxy) propanoic acid in roasted coffee beans. Analysis of the methyl esters by chiral high performance liquid chromatography. Journal of Agricultural and Food Chemistry 37(1); 1989; 58-60

Methyl 2-(4-methoxyphenoxy) propanoate, previously shown to be present in methylated aqueous extracts of roasted Colombian Arabica coffee beans, was purified by reversed-phase high-performance liquid chromatography (HPLC) with a Chromspher C_{18} column (250 x 4.6 mm). The purified extract was analyzed by chiral HPLC with a Chiralcel OK column (250 x 4.6 mm), which provided excellent separation of the two enantiomers of the ester. The methyl 2-(4-methoxyphenoxy) propanoate in the methylated coffee extract was shown to be composed of predominantly (80%) the (S)-(-) enantiomer. AS

1799 Rathbone (EB), Patel (GD), Butters (RW), Cookson (D) and Robinson (JL). Occurrence of 2-(4-methoxyphenoxy) propanoic acid in roasted coffee beans. Analysis by gas liquid chromatography and by high-performance liquid chromatography. Journal of Agricultural and Food Chemistry 37(1); 1989; 54-58

Fruit juices

Apple juices

1800 Imeri (AG) and Knorr (d). Effects of chitosan on yield and compositional data of carrot and apple juice. Journal of Food Science 53(6); 1988; 1707-1709

Effects of chitosans on yield, titratable acidity, pH, soluble solids, and colour of carrot and apple juice were evaluated. Carrots (`Lange Rose Stumpfe') and apples (`Golden Delicious') were treated with chitosan solutions (in 2% ascorbic acid) or two different concn. and viscosities at 25 C between 0 and 120 min. The juices were obtained with a lab. cage press following a standard program during 20 min. Treatments with chitosan produced no effect on juice held by pH value and soluble solids were affected. Also chitosan treatment resulted in significant (P < 0.05) reduction of titratable acidity and colour index. Reduction of Beta -carotene in carrot juice was also achieved and correlated with colour index. AS

Citrus juices

1801 Fellers (PJ). Shelf life and quality of freshly squeezed, unpasteurized, polyethylene-bottled citrus juice. Journal of Food Science 53(6); 1988; 1699-1702

Florida's chief orange and grapefruit cvs were used to produce the freshly squeezed, unpasteurized, polyethylene-bottled juices using commercial conditions. Juices were stored at different temp. shelflife depended primarily on storage temp. -1.7 C, 20-23 days, 1.1 C, 16-22 days; 4.4 C, 10-16 days; and 7.8 C, 5-8 days. Staleness was primary off-flavour limiting shelf life at the three lower temp. while spoilage with diacetyl was primarily responsible at 7.8 C. At the three lower temp., microbial counts generally decreased markedly during storage, while at 7.8 C, an increase was generally noted. Ascoribc acid retention after 2 wk of storage at the three lowest storage temp. was about 91-93% for two orange juices and 86-88% for the grapefruit juice. AS

Grapes juices

1802 Hofsommer (H-J). Determination of sulphur dioxide in grape juices. Flussiges Obst 56(1); 1989; 22 (De).

Mango juices

1803 Joseph (G) and Mahadeviah (M). Suitability of flexible packaging materials for packing mango juice. Indian Food Packer 43(2); 1989; 57-65

Mango juice was packed and processed in plain polyester/37 MU polyethylene (PET/PE); metallised PET/PE; PET/foil PE; Met. PET/high density (HD) low density (LD) PE + PET/HD-LDPE stand up pouches. The storage studies done for 10 wk at 37 C indicated that mango juice packed in PET/foil PE retained ascorbic acid and $Beta$-carotene better than other foils and tin cans and the quality was organoleptically acceptable. The content of total soluble and total reducing sugars in mango juice did not show significant difference between those packed in flexible pouches and tin cans stored for 10 wks. KAR

Orange juices

1804 Gray (LE). The production of fresh orange juice. Flussiges Obst 56(1); 1989; 19-20 (De).

This articles discusses the conditions to produce a freshly squeezed, unpasteurized orange juice, which will be delivered directly to the consumer and outlets. The processing of the oranges and more details are discussed. BV

1805 Marcy (JE), Hansen (AP) and Graumlich (TR). Effect of storage temperature on the stability of aseptically packaged concentated orange juice and concentrated orange drink. Journal of Food Science 54(1); 1989; 227-228

Commercial orange drink conc. and two orange juice conc. were aseptically packed in flexible bags and stored at 4, 15, 22, 30 C for 6 months. Ascorbic acid, nonenzymatic browning and sensory quality were measured monthly. Sensory characteristics for drink conc. deteriorated after 3 and 4 months at 30 C and 22 C, resp. Juice conc. were unacceptable after 2 and 5 months at 30 C and 22 C, resp. Drink conc. ascorbic acid loss was greater than juice conc. at 4, 15, and 22 C. Changes in nonenzymatic browning as measured by Hunter colour and by absorbance at 420 nm were similar to changes in other containers. The quality of refrigerated aseptic drink (15 C) and juice (4 C) was similar to frozen conc. (-18 C). AS

1806 Moshonas (MG) and Shaw (PE). Flavour evaluation and volatile flavour constituents of stored aseptically packaged orange juice. Journal of Food Science 54(1); 1989; 82-85

Samples of commercial orange juice packaged aseptically and stored at 21 C and 26 C were evaluated weekly by a sensory panel using hedonic ratings. Flavour scores were significantly lower than control juice and unacceptable after 1 wk at 26 C and 2 wk at 21 C. The flavour score decreased to 50-60% of the starting value during 6 wk storage. The volatile components, $Alpha$-terpineol and ethyl acetate, increased during storage. A component not identified earlier as a volatile citrus component was identified as 2-(2-butoxyethoxy) ethanol. This and the observed increase in ethyl acetate during storage might have come from the laminated multilayered package liner. Limonene in juice decreased about 40% during storage. Other major volatile components did not change markedly. AS

1807 Philip (T), Chen (T-S) and Nelson (DB). Detection of adulteration of California orange juice concentrates with externally added carotenoids by liquid chromatography. Journal of Agricultural and Food Chemistry 37(1); 1989; 90-95

1808 Trifiro (A), Scapellato (B), Gherardi (S), Zanotti (A) and Bazzarini (R). Detection and determination of galacturonic acid in Italian orange juices. Industria Conserve 63(3); 1988; 217-222 (It).

A high-pressure liquid-chromatographic (HPLC) method for determining galacturonic acid in orange juices was developed. In comparison tests, the HPLC method was found to give more accurate results than Wallrauch's colorimetric one, being free from interferences. In another series of test, the HPLC method was applied to samples of organe juices which had been inactivated microbiologically, but not enzymatically. Significant amounts of galacturonic acid accumulated in these samples because of the presence of polygalacturonase activity. AS

Tea

1809 Flaten (TP) and Odegard (M). Tea, aluminium and Alzheimer's disease. Food and Chemical Toxicology 26(11/12); 1988; 959-960

1810 Malec (LS) and Vigo (MS). Seasonal variation in theaflavin, thearubigin and caffeine content of Argentinian black teas. Journal of the Science of Food and Agriculture 45(2); 1988; 185-190

Thirty-three Argentinian black tea samples of three grades (BOP, BOPF and PF) obtained fortnightly were examined for their theaflavin (TF), thearubigin (TR) and total and extractable caffeine contents during the 1985/86 seasons. Total extractable caffeine contents decreased gradually during most of the season after an early rapid increase. TF contents fluctuated following climatic variations, decreasing after rainy periods. Total colour and TF curves were consistent with there being a good linear correlation between them, whereas TR showed erratic fluctuations throughout the whole season. AS

1811 Owuor (PO), Othieno (CO), Howard (GE), Robinson (JM) and Cooke (RD). Studies on the use of shade in tea plantations in Kenya. Journal of the Science of Food and Agriculture 46(1); 1988; 63-70

Tea was processed from leaves grown on unshaded, artificially shaded and Grevillea robusta Cunningh shaded plots at four different levels of N application (0 to 270 kg ha^{-1} year^{-1}). Tea grown under artificial shade produced black tea with higher theaflavin and reduced thearubigin concn. and with a better flavour index and tasters evaluation than did tea grown without shade. The heavier (artificial) shading gave teas better than those derived from G. robusta shaded teas. No statistically significant effects on the caffeine contents were observed. The data presented suggest that the removal of shade from tea gardens leads to a loss in quality. The need for a more complete economic evaluation is discussed. AS

FATS AND OILS

Fats

1812 Homberg (E) and Bielefeld (B). Composition and content of sterols in 41 different vegetable and animal fats. FAT Science and Technology 91(1); 1989; 23-27 (De).

Sterol comp. was determined in 41 different vegetable and animal fats using gas-liquid chromatography equipped with capillary column. N

Lipids

1813 Grosch (W). Aroma compounds formed by peroxidation of lipids. FAT Science and Technology 91(1); 1989; 1-6 (De).

Carbonyl compounds, showing low odour and taste thresholds, have been identified. Differentiation of potent aroma compounds from the other components of the volatile fraction is discussed. The contribution of aroma compounds derived from lipid peroxidation to the aroma of some foods of plant origin and of cooked meat is discussed. N.

Oils

1814 Bhattacharyya (S), Bhattacharyya (DK), Chakraborty (AR) and Sengupta (R). Enzymatic deacidification of vegetable oils. FAT Science and Technology 91(1); 1989; 1-6

Vegetable oils with high content of free fatty acids can be deacidified satisfactorly by enzymatic esterification process under optimum conditions of temp. pressure and enzyme amount. The enzymatic deacidification process can be a new process of deacidification. AS

1815 Nogala-Kalucka (M) and Gogolewski (M). Post deodourization condensates from soy and rapeseed oils as a source of tocopherols. Indian Journal of Plant Physiology 91(1); 1989; 39-40 (De).

For refining of differnt kinds of plant oils the same industrial installation are used. The qualitative and quantitative comp. of tocochromanols obtained from post deodourization, condensates depends on the refined oil. The influence of the quantity of refined oils in the process on quantitative changes of tocopherols in the condensates was investigated. We found, that for the eventual obtaining of tocopherol conc. from them, it is better to use soy post deodourization condensate. The max. concn. of tocopherols in soy condensate was found after deodourization of approx. 26 tons of the oil at an installation yield of about 3.5 tons per h. AS

1816 Smiles (A), Kakuda (Y) and Mac Donald (BE). Effect of degumming reagents on the composition and emulsifying properties of canola, soybean and sunflower acetone insolubles. Journal of the American Oil Chemists" Society 66(3); 1989; 348-352

Six degumming reagents namely water, citric, phosphoric and oxalic acids plus acetic and maleic unhydride were used to degum crude canola, soybean and sunflower oils and acetone insolubles obtained thereafter were analysed for phospholipid components by HPLC. The phospholipid comp. data indicated that the chemical degumming reagents did not drastically alter the phospholipid profiles. MNK

1817 Trost (VW). Characterisation of corn oil, soybean oil and sunflower seed oil nonpolar material. Journal of the American Oil Chemists" Society 66(3); 1989; 325-333

Fractions of varying polarity from corn, soybean and sunflower seed oils were isolated by normal phase preparative and semi preparative liquid chromatography and characterised by mass spectrometry, nuclear magnetic resonance spectroscopy and by other techniques. MNK

Fish oils

1818 de Koning (AJ) and Mol (T). A convenient method for the accurate determination of phosphorus in fish oils. FAT Science and Technology 91(1); 1989; 36-38

The P content of fish oil was determined by acid hydrolysis for 168 h (one wk) in 2 M HCl at 120 C in glass tubes, followed by filtration and molybdenum blue colour development in an aliquot of the filtrate. The method is regarded as a convenient routine lab. procedure, and the results obtained by the method are in good agreement with those obtained with the ashing procedure of the American Oil Chemists' Society. The detn. has been satisfactorily applied to the analysis of many South African fish oils. AS

Melon seed oils

1819 Ogunsua (AO) and Badifu (GIO). Stability of purified melon seed oil obtained by solvent extraction. Journal of Food Science 54(1); 1989; 71-73

The stability of crude or purified melon oil extracted from unroasted and roasted seeds of Citrullus vulgaris Schrad under selected storage conditions was investigated. Purification did not affect the fatty acid comp. of the oil. There were no differences in the levels of alpha-tocopherol and beta-carotene in the crude oil from roasted and unroasted seeds. Purification and bleaching of the oil led to losses in both alpha-tocopherol and beta-carotene. Purification lowered the stability of the oil even in the presence of added butylated hydroxyanisole. The stability was lowest in the purified and bleached oil. AS

Olive oils

1820 Gutierrez (F), Albi (MA), Palma (R), Rios (JJ) and Olias (JM). Bitter taste of virgin olive oil. Correlation of sensory evaluation and instrumental HPLC analysis. Journal of Food Science 54(1); 1989; 68-70

A method for the extraction by C columns and HPLC analysis of bitter components of virgin olive oils was developed. Factorial design showed the suitability of using two columns and three HPLC analyses per samples. An equation obtained by multiple regression analysis, related bitterness with the area of peaks, which explained 92% of variance. AS

Soybean oils

1821 Brown (HG) and Snyder (HE). Factors influencing phospholipid adsorption on silica from soybean oil miscella. Journal of the American Oil Chemists" Society 66(3); 1989; 353-355

Phospholipids can be removed from crude soybean oil miscellas by adsorption on silica. The adsorption is not complete even though the silica has not been saturated. Micelle formation and Ca salts of phospholipids were ruled out as causes for the incomplete adsorption pattern, and competition for adsorption sites by triglyceride was judged to be the likely cause. AS

Sunflower oils

1822 Conte (L), Zaggerini (A) and Tosi (Z). Changes in composition of sunflower oil extracted from achenes of Sclerotium bataticola infected plants. Journal of Agricultural and Food Chemistry 37(1); 1989; 36-38

Changes in physicochemical components and fatty acid comp. of sunflower oil due to Sclerotium bataticola infection are reported. In both var. cvs. Gloriasol and Romsun HS 301, achenes from infected plants showed a per cent reduction in crude fiber content, oil, ash content, and wt. of 1000 achenes. However, there were increases in protein content and N free extract. Fatty acid comp. of oil extracted from achenes of infected plants showed appreciable differences compared to healthy plants. Differences were also observed in cation concn. AS

Lime oils

1823 Pino (J) and Rosado (A). Analysis of Persian lime essential oil. Nahrung 32(10); 1988; 977-980

Commercially produced Persian lime essential oil was qualitatively and quantitatively analyzed by GC-MS. The oxygenated components represent 25% of the total comp. The major and most of the minor components that was isolated from essence oil had been previously identified from coldpressed oil or aqueous essence. Three minor components, 3-methyl-2-butanol, trans- carvyl and cis -carvyl acetate, not previously found in lime, were identified in this study. AS

SPICES AND CONDIMENTS

Spices

1824 Lokendra Singh (L), Mohan (MS), Padwal Desai (SR), Sankaran (R) and Sharma (TR). The use of gamma irradiation for improving microbiological qualities of spices. Journal of Food Science and Technology, India 25(6); 1988; 357-360

The ability of gamma irradiation in reducing microbial contamination was investigated in turmeric, black pepper and chilli. The initial total plate count varied from $10^4 - 10^6$, coliform count from $10^2 - 10^5$, spores from $10^2 - 10^5$ and yeast and moulds from $10^2 - 10^3$ /g of the sample. Treatment with Gamma -rays (Co) at dose levels of 1-10 kGy were studied. From the data, it was concluded that dose levels of 4-5 kGy were sufficient to reduce the bioburden to acceptable levels. AS

Cardamon

Cardamon oils

1825 Sankarikutty (B), Sreekumar (MM), Narayanan (CS) and Mathew (AC). Studies on microencapsulation of cardamon oil by spray drying technique. Journal of Food Science and Technology, India 25(6); 1988; 352-356

The characteristics of the spray dried microcapsules of cardamom oil using gum acacia, dextrin white and maltodextrin as wall materials have been determined by chemical analysis and scanning electron microscopy. It was seen that while gum acacia gave spherical capsules with dents but better oil retention, less surface oil and practically no cracks, maltodextrin gave slightly more roundish capsules and had cracks on the surface. Various combinations of the two wall materials have also been tried of which the combination of maltodextrin and gum acacia in the ratio 30:70 gave the best quality capsules. AS

Chillies

1826 Muralidhara) and Marasimhamurthy (K). Non-mutagenicity of capsaicin in albino mice. Food and Chemical Toxicology 26(11/12); 1988; 955-958

Capsaicin, the active principle of red pepper, administered intraperitoneally to adult male mice at doses of 0.4, 0.8 or 1.6 mg/kg body wt./day (1/20, 1/10 or 1/5 of the LD_{50}) on five consecutive days, did not induce any clinical signs of toxicity. No significant alterations were observed in epididymal wt., caudal sperm counts, testicular wt. or testicular histology. In the sperm morphology assay, sperms at 1, 3, 5 and 7 wk did not reveal any treatment-related increase in the incidence of sperm-head abnormalities. Capsaicin also failed to induce dominant-lethal mutations during an 8-wk sequential mating schedule of males treated at the highest dose. AS

Fennel

1827 Verghese (J). Fennel. Indian Cocoa, Arecanut & Spices Journal 12(2); 1988; 39-43

A review dealing with various aspects of fennel oil including the physical and chemical characteristics of oils from different sources, chemical comp. of sweet and bitter fennel oils, components of fennel oils and constitutents of the oil of Foeniculum vulgare, var. vulgare. Yields of fennel extractives with different solvents is also given. KAR

Pepper

1828 Gopalam (A) and John Zacharia (T). Black pepper oil- chemical and aroma quality. Indian Cocoa, Arecanut & Spices Journal 12(2); 1988; 44-45

The review covers physical properties of black pepper oil (sp. gr., refractive index, acid no., ester no., solubility in alcohol and reaction to phellandrone test); mono and sesquiterpene hydrocarbons and their oxygenated compounds in some popular horticultural var. of black pepper, list of commonly occuring mono and sesquiterpene hydrocarbons and their oxygenated compounds in black pepper, and their natural source and perceived aroma. KAR

SENSORY EVALUATION

Nil

FOOD STORAGE

1829 Ahmad (SG) and Dwyer (SV). Ipomea cornea reinforced mud grain storage structure. Bulletin of Grain Technology 26(3); 1988; 197-207

The performance of a mud grain storage structure of 1 t. capacity constructed using Ipomea cornea (Besharam) plant stalks as reinforcing material and filled with Bengal gram (Cicer arietinum) was tested for 184 days of storage period. The temp. difference of 4.6 C was observed between the grain and ambient air temp. The variation in grain temp. which indicates that the structure possesses good thermal property and is resistant to atm. temp. The max. variation in the moisture content of the grain was only 0.89% which showed that the structure provided a good resistant to moisture migration and condensation. There was 5% fall in germination, 1.87% loss in wt. and 7% discolouration in the grain due to 5% insect infestation during the last month of storage. Besides there was an over all increase of 0.11% total protein content and 0.21% increase in free fatty acid value. Thus the structure proved to be very sound against any structural failure or defects. The Ipomea stalks used in this fabrication were found to possess high strength wt. ratio and good decay resistance quality. The structure emerged excellent against weather and water proofing. The rodent could not damage the stored grain. NGKR

1830 Balwinder (KS), Charanjeet (KH), Jasbir (KK), Sukhwant (KM) and Kanta (KS). Effect of income and education on prevalence of grain storage practices in Ludhiana district of Punjab. Bulletin of Grain Technology 26(3); 1988; 191-196

The effect of income and education on the prevalence of grain storage practices adopted in 8 villages of Ludhiana Dist. of Punjab, India has been investigated in the present study. A total of 147 families were surveyed for methods of wheat storage at domestic level. The results showed that 54.4% of families were using metal bins whereas 58.2% were using aluminium phosphide for wheat storage. Neither education nor land holding influenced the method of storage but use of insecticide depended very much on their land holding and educational status. NGKR

INFESTATION CONTROL AND PESTICIDES

1831 Sone Lal, Shiv Shanker, Yadav (AS), Ashok Kumar and Srivastava (JL). Field trial with deltamethrin against stored grain insect pests. Bulletin of Grain Technology 26(3); 1988; 187-190

Deltamethrin 2.5% w.p. was evaluated against the control of stored grain insect pests in commercial grain warehouses. Stacks of wheat grain were sprayed with deltamethrin 2.5% w.p. at the dose of 30 mg. a.l./m.^{2} Malathion 50% E.C. at the dose of 0.15 g. a. l./m^2 was also sprayed for studying the comparative efficacy. Deltamethrin treated lot showed 80--100% mortality in adults of Tribolium castaneum (Herbst) and Rhizopertha dominica (Fabr.), while malathion gave 50-80% mortality in above insects. The mortality in adults of T. castaneum and R. dominica present in grain bags ranged from 50-60 and 40-50% sprayed with deltamethrin and malathion resp. Deltamethrin was found to be more effective than malathion against the adults of both the above insects. AS

Infestation control

1832 Locatelli (DP) and Ceffa (AM). Tests of resistance to different degrees of vacuum of eggs of some stored products lepidoptera. Industrie Alimentari 27(263); 1988; 743-745 (It).

The resistance of eggs of Lepidoptera phycitidae, Ephestia cautella (Walker), Ephestia kuehniella zeller, Plodia interpunctella (Hb.) and of Galleridae Corcyra cephalonica (Stainton) to different degrees of vacuum and RH has been studied. Survival of eggs of tested sp. showed no considerable differences have been noticed. All has been generally observed that at a degree of technical vacuum higher or equal to 640 mm Hg eggs don't hatch. While at lower values survival differs according to relative humidity of environment. The largest emerging of larvae has been noted in presence of relative humidity ranging from 40% to 80%. AS

1833 Menn (JJ) and Borkovec (AB). Insect neuropeptides. Potential new insect control agents. Journal of Agricultural and Food Chemistry 37(1); 1989; 271-278

Pesticides

1834 Agrawal (RM) and Girish (GK). Studies on the residues of ethylene dibromide in stored wheat infested by different insects of stored commodities under Indian conditions. Bulletin of Grain Technology 26(3); 1988; 228-237

EDB residues in wheat (10% moisture content) after fumigation at 3, 5 and 7 ml/100 kg with 7 days exposure period at zero h of aeration were found to be 15.0, 20.4 and 23.7 p.p.m. resp. Wheat with 12% moisture content had 21.4, 25.6 and 27.0 p.p.m. EDB residues for the above 30 days of exposure were 15.5 21.3, 24.4 p.p.m. and 14.2, 18.7, 19.6 p.p.m. resp. in wheat with 10% moisture content while the values were 22.3, 26.2, 27.7 p.p.m. and 20.0, 23.9, 26.1 p.p.m. resp. for 12% moisture content for the above 3 levels of fumigation. On aeration of wheat (10% moisture) in sum for two h, the residues were 10.0, 12.7, 16.3 p.p.m.; 9.6, 12.1, 13.1 p.p.m.; 7.6, 11.8, 10.0 p.p.m. resp. for 7, 14 and 30 days exposure on above three levels of fumigation. The trend of residue dissipation did not alter with longer aeration in sun. The EDM residue in milled atta was reduced by about one third compared to EDM residue in aerated (0-6 days) wheat. The residue in baked `Chapathies' was below detectable level in all samples. `Chapathies' prepared from EDB exposed wheat were organoleptically good and the fumigation did not affect the seed germination adversely. KAR

1835 Thakre (BD), Bansode (PC) and Sone ıal. Use pattern of aluminium phosphide as grain fumigant at farm level in Madhya Pradesh. Bulletin of Grain Technology 26(3); 1988; 220-223

The extent at which aluminium phosphide has been actually used as grain fumigant at farm level and the health hazards caused by its improper use by the farmers in their houses has been assessed in this investigation. These studies carried out on the storage practices adopted by 120 farmers in Madhya Pradesh, India showed that Al. phosphide tablets was used by about 51% of the farmers than any other protectants. In spite of the inadequate knowledge of the correct technique and the hazards experienced using Al. phosphide tablets no accident was reported during its use by the farmers. NGKR

BIOCHEMISTRY AND NUTRITION

Biochemistry

1836 Kujawa (M), Friedrich (M), Macholz (R), Oaierenski (B) and Walzel (E). Bioavailability of minerals. Part 1. Methods of determination. Nahrung 32(10); 1988; 971-976 (De).

Minerals have a important role in metabolism. Only a little is known on the recommended intake for maintenance of body function. Supplying depends on the bioavailability. Methods for experimental detn. are described and limits and possibilities are discussed. AS

Amino acids

1837 Friedman (M) and Pearce (KN). Copper (II) and cobalt (II) affinities of LL-and LD-lysinolalanine diasteromers. Implication for food safety and nutrition. Journal of Agricultural and Food Chemistry 37(1); 1989; 123-127

Nutrition

1838 Gouri Rani Chose. Vegetarian diet "Shakahar". Indian Journal of Nutrition and Dietetics 25(5); 1988; 159-165

Different types of food/raw materials used in India in vegetarian diet, seasonal variation in food intake their special qualities and how they are useful for keeping good health are reviewed. KAR

1839 Janabai Giri, Jayanthi (GP) and Selvi (S). Evaluation of selenium and chromium content in selected foods II. Indian Journal of Nutrition and Dietetics 25(5); 1988; 140-145

In this study selected var. of egg, milk, meat, seafoods and vegetables were evaluated for Se and Cr contents. Results showed that hen's egg was richer in Se and Cr compared to pigeon's egg. Goat's milk had highest and buffalo's milk lowest amount of Se whereas buffalo's milk highest and cow's milk lowest amount of Cr. Se content in cow's milk ranged between 1.6-2.02 µg/dl due to the forage crops fed to the animals which is related to the Se content of soil. Se content ranged between 0.01-0,86 µg/g in meat whereas Cr ranged between 0.09-0.,128 µg/g. Se in fish ranged from 0.35-1.17 µg/g and Cr ranged from 0.07 to 0.22 µg/g. Se in vegetables ranged from 0.003-0.47 µg/g whereas Cr ranged from 0.025-0.049 µg/g. These studies indicated that milk is a rich source of Se and Cr; pork and fish are high in Se, vegetables are poor in both. KAR

1840 Kanchana (S) and Shurpalekar (KS). Indian regional diets. Zinc content and absorption in rats. Nutrition Reports International 39(2); 1989; 399-407

The Zn absorption from the diets of low income groups of the state of Karanataka, India, has been studied in this investigation. For this purpose three different regional diets were formulated based on rice-wheat, rice-ragi or ragi and the effect of these diets on the absorption, serum and femur concn. of Zn in rats was studied. The results showed that rats fed rice-wheat diet showed a lower growth response and lowered absorption of Zn than those fed the other two diets. But no strict correlation between the growth response, the phytate/Zn molar ratio in the diet and Zn absorption was observed. It was also seen that the Zn concn. in serum and femur were within the normal range in rats fed with all the three diets. NGKR

1841 Poneros-schreier (AG) and Erdman (JrJW). Bioavailability of calcium from sesame seeds, almond powder, whole wheat bread, spinach and nonfat dry milk in rats. Journal of Food Science 54(1); 1989; 150-15

Calcium bioavailability (BV) from sesame seeds, almond powder, whole wheat bread, spinach, and nonfat dry milk (NFDM) was compared to Ca BV from a calcium carbonate supplemented control diet using a rat model. When comparing different Ca sources, the relative BV of the products was calcium carbonate (100%), NFDM (100%) whole wheat bread (95%), almond powder (66%), sesame seeds (65%), NFDM and spinach mixture (52%), and spinach (47%). Separate almond, NFDM, and calcium carbonate diets were supplemented with 0.4% ascorbic acid; vitamin C addition had no significant effect on Ca BV. AS

1842 Zsinka (AJN), Peredi (J), Lidner-Szotyori (K) and Biro (G). Effect of interesterified dietary fat mixtures on various lipid indices and liver metal content of rats in fat-metabolism distrubance. Nahrung 32(9); 1988; 815-823

TOXICOLOGY

Carcinogens

1843 Alink (GM), Reijven (PLM), Sijtsma (R), Jongen (WMF), Topp (RJ), Kuiper (HA) and Koeman (JH). Effects of human diets on biotransformation enzymes activity and metabolic activation of carcinogens in rat liver. Food and Chemical Toxicology 26(11/12); 1988; 883-891

Effects of a complete human diet, based on mean consumption figures in the Netherlands, the heating of food, and the presence of vegetables and fruit in the diet on the drug metabolising capacity of the rat liver and an metabolic activation of known carcinogen were studied. The results indicate that the influence of components of human diets on rat-liver drug metabolism may have quite different effects on the trotransformation of carcinogens activated by different metabolic pathways. MVG

Mycotoxins

Aflatoxins

844 Farag (RS), Daw (ZY) and Abo-Raya (SH). Influence of some spice essential oils on Aspergillus parasiticus growth and production of aflatoxins in a synthetic medium. Journal of Food Science 54(1); 1989; 74-76

Gas-liquid chromatography was used to determine the essential oil comp. of thyme, cumin, clove, caraway, rosemary, and sage. The basic components of these oils were thymol, cumin aldehyde, eugenol, carvone, borneol and thujone, resp. The antifungal potential of the oils against Aspergillus parasiticus were investigated. The essential oils caused complete inhibition of both mycelial growth and aflatoxin production. The effectiveness followed the sequence: thyme > cumin > clove > caraway > rosemay > sage. The major components of the essential oils produced an inhibitory effect at min. inhibitory concn. equal to those obtained with the oils. AS

Ochratoxins

1845 Mutti (P), Spotti (E) and Campanini (M). Effect of temperature on growth and production of ochratoxin A by Penicillium verrucosum strains. Industria Conserve 63(3); 1988; 248-251 (It).

The ability of seven Penicillium verrucosum strains to grow and to produce ochratoxin A in a sucrose -containing culture medium was studied as a function of incubation temp. (0. 3, 5, 18, and 25 C). For all strains, max. production of ochratoxin A was observed after 14 days at 25 C. Remarkable amounts of the metabolite accumulated in the cultures incubated at 18 C, while only two strains proved able to produce it at 5 Degree C. At the lowest temp. used (0 and 3 Degree C) the moulds grew but did not produce any ochratoxin A. AS

Pesticide residues

1846 Sastry (CSP), Satyanarayana (P), Rama Mohana Rao (A) and Rajendra Singh (N). Spectrophotometeric determination of thiram, ziram and zineb in formulation, water, grains and vegetables using oxidised haematoxylin. Journal of Food Science and Technology, India 25(6); 1988; 377-378

A highly sensitive spectrophotometric method has been developed for the detn. of thiram, ziram and zineb, by heating them with oxidized haematoxylin in water bath at 70 C for 5 min under neutral conditions. The absorption max. of the coloured sp. so formed is at 555 nm. The method is simple, reproducible and accurate within plus or minus 1% and applicable to the assay of thiram, ziram and zineb in fungicidal formulations, water samples, grains and vegetables. AS

FOOD LAWS AND REGULATIONS

Nil

SPICES
(1987 - 1988)
A Bibliography

The National Information Centre for Food Science and Technology, CFTRI, Mysore has just compiled a bibliography on Spices covering the period 1987-1988. The bibliography lists 508 titles. Price Rs.50/- + postage. Copies can be had from The Area Coordinator, FOSTIS, CFTRI, Mysore - 570 013. The Demand Draft should be drawn in favour of "Director, CFTRI, Mysore".

GENERAL

1847 Adsule (PG). Status of small scale food industries in India. **Indian Food Industry** 8(1); 1989; 13-19

1848 Bhalerao (SD), Mulmuley (GV), Ananthakrishna (SM) and Potty (VH). Waste and waste water management in food industry. II. Milk and meat processing. **Indian Food Packer** 43(3); 1989; 35-52

Aspects covered in this review include various types and vol. of waste products produced during the processing of milk; their comp. and characteristics tolerance limits; and cost of waste treatment. In the meat processing industry, the details dealt with are comp. of slaughter house waste and meat packaging plant waste, general characteristics of the fish processing waste water; and different methods for their treatment including the recovery of by-product. 102 references. KAR

1849 Bhat (RV). Mould deterioration of agricultural commodities during transit. Problems faced by developing countries. **International Journal of Food Microbiology** 7(3); 1988; 219-225

Huge quantities of agricultural commodities are being either imported or exported by the developing countries. The commodities have to be transported from the fields of cultivation to the centres of consumption, considerable time being taken for the movement not only because of long distances but also because of various socio-economic, environmental and biological reasons. These commodities are likely to be damaged by mould growth and subsequent aflatoxin accumulation. If the contamination occurs during transit, often no insurance cover for the risk is available. Because of different methods of sampling followed in the exporting and importing countries it is often difficult to define the exact responsibility of the development of aflatoxin as having takes place during transit. The statistics of the export of aflatoxin high-risk commodities like red pepper (chillies), cotton seed and groundnut extractions clearly, for the last decade, demonstrate the extent of loss suffered by the exporting countries because of aflatoxins. The problem of mould damage and mycotoxin contamination can be minimised by improving facilities for storage at ports and transit points as well as on ships. AS

1850 Hill (B). Chemical treatment of recirculating water in tunnel pasteurisers. **International Bottler and Packer** 63(10); 1988; 38-40

FOOD PROCESSING

1851 Pace (RD), Plahar (WA) and Lu (JY). Status of traditional food preservation methods for selected Ghanian foods. **Food Reviews International** 5(1); 1989; 1-12

Review. 30 references. BV

Extrusion

1852 Dziezak (JD). Single and twin-screw extruders in food processing. **Food Technology** 43(4); 1989; 164-174

This report discusses the principles of extrusion and describes the operational differences, advantages, and applications of single- and twin-screw cooker extruders. BV

Extrusion cooking

1853 Bounie (D). Modelling of the flow pattern in a twin-screw extruder through residence-time distribution experiments. **Journal of Food Engineering** 7(2); 1988; 223-246

1854 Van Zuilichem (DJ), Jager (T) and Stolp (W). Residence time distributions in extrusion cooking. Part II. Single screw extruders processing maize and soy. **Journal of Food Engineering** 7(3); 1988; 197-210

1855 Van Zuilichem (DJ), Jager (T) and Stolp (W). Residence time distributions in extrusion cooking. Part I. Coincidence detection of radiotracer. **Journal of Food Engineering** 7(2); 1988; 147-158

In this study a method suitable for the measurement of residence time distributions in food extruders based on radiotracer techniques has been improved by the introduction of a coincidence detection system which replaces the single detector system with its asymmetrical sight angle of detection. This method was found to be more advantageous in better resolution due to minimisation of the sight angle. The influence of the detector arrangement on the residence time distribution curves for a single screw extruder was measured with the help of a model where 64 cn was used as the tracer. NGKR

FOOD PACKAGING

Packaging materials

1856 Kim (H), Gilbert (SG) and Johnson (JB). Determination of potential migrants from rubber gaskets of commercial aerosol values used in food packaging. **Journal of Food Science** 54(2); 1989; 465-467

Potential migrants were isolated from gaskets of commercial aerosol valves with methylene chloride using Soxhlet apparatus. A large number of compounds appeared to be curing or processing aids including activators and antioxidants. Several sulphur-containing reaction products and polynuclear aromatic compounds such as phenanthrene, fluoranthene, and pyrene were also identified. The same type of gaskets were stored in the Freon propellant at room temp. for a prolonged period of time and the amount of identified migrants in the extract was investigated. AS

FOOD ENGINEERING AND EQUIPMENT

Engineering

1857 Aguerre (RJ), Suarez (C) and Viollaz (PE). Modelling temperature dependence of food sorption isotherms. **Lebensmittel-Wissenschaft und-Technologie** 22(1); 1989; 1-5

The equilibrium data of water sorption in several food products were tested by means of the equation Chi in water activity = k_1 and k_2 , where CHI_{Tau} is a parameter that takes into account the effect of temp. on sorption isotherm. For the products investigated it was found that the CHI parameter correlated reasonably well with the equilibrium data at different temp.; K_1 and K_2 were characteristic parameters of the substance. It was also demonstrated that such an equation permitted an easy estimation of temp. shift. AS

1858 Boe-Ocansey (O). Freeze-drying in a fluidized-bed atmospheric dryer and in a vacuum dryer. Evaluation of external transfer coefficients. **Journal of Food Engineering** 7(2); 1988; 127-146

1859 Castell-Perez (ME), Heldman (DR) and Steffe (JF). Computer simulation of microbial growth during freezing and frozen food storage. **Journal of Food Process Engineering** 10(4); 1989; 249-268

This paper describes computer simulation of microbial growth during freezing and frozen food storage. It covers theoretical considerations, temp. equilibration time prediction model, microbial growth prediction model, influence of freezing process and storage conditions on product quality, microbial growth during temp. equilibration period, application of simulation model in the frozen food industry and conclusions. NGKR

1860 Rhim (JW), Nunes (RV), Jones (VA) and Swartzel (KR). Determination of kinetic parameters using linearly increasing temperature. **Journal of Food Science** 54(2); 1989; 446-450

For a linearly increasing temp., a differential kinetic model is presented for the detn. of kinetic parameters, i.e. activation energy, frequency factor, and reaction order. The performance of this method is illustrated by using two well known chemical reactions: acid-catalyzed sucrose hydrolysis and hydrolysis of N-acetyl-p-aminophenol in aqueous solution. Both computer generated and experimentally determined data sets were used for sucrose hydrolysis and published data were employed in the N-acetyl-p-aminophenol hydrolysis. The results obtained by this method agree well with isothermal kinetic data, for the first reaction, and nonisothermal data, for the second reaction. This method is faster, and more accurate than previously reported methods. AS

1861 Suzuki (K), Onishi (H), Esaka (M), Kubota (K) and Hosaka (H). Low temperature drying of agar gel sphere in desiccated cold air flow. Journal of Food Science 54(2); 1989; 416-418

Agar gel spheres (diameter = 4.0, 7.2 and 12.5 cm) were dried in desiccated air flow at low temp. near freezing point (from -9.3 to 10.7 C) at atm. pressure. Air velocities ranged from 0.05 to 0.32 m/sec. The drying rates during the constant drying rate period were directly proportional to the moisture vapour pressure at the sample surface. A linear relationship between the drying rate and the square root of the air velocity was obtained at each air temp. Further, the film coeff. of heat transfer were evaluated and arranged as a semi-empirical dimensionless equation. AS

Equipments

1862 Anon. Salad preparation with ultra equipment. Food Trade Review 58(12); 1988; 685-686

ENERGY IN FOOD PROCESSING

Nil

FOOD CHEMISTRY AND ANALYSIS

Chemistry

1863 Falabella (MC), Aguerre (RJ) and Suarez (C). Determination of the heat of water vapour sorption by means of electronic hygrometers. Lebensmittel-Wissenschaft und-Technologie 22(1); 1989; 11-14

A method for the detn. of the heat of water sorption by means of the Novasina Thermoconstanter Humidat TH2 meter was presented. This methodology was used to determine the heat of water desorption in maize at different moisture contents. The principal advantage of the method is that it permits a direct measurement of isostere lines. AS

FOOD MICROBIOLOGY AND HYGIENE

Enzymes

Papain

1864 Sattar (A), Delincea (H) and Diehl (JF). Irradiation of industrial enzyme preparation. Characterisation of irradiated papain by gel filtration gel electrophoresis and thin-layer isoelectric focusing. **Lebensmittel-Wissenschaft und-Technologie** 21(6); 1988; 319-323

Decontamination of industrial enzyme preparations by radiation processing is a valuable alternative to other procedures designed to eliminate microorganisms. To identify possible changes in its physico-chemical properties, industrial papain was characterized with respect to its charge and size properties by means of isoelectric focusing, thin-layer gel filtration and SDS-polyacrylamide gel electrophoresis. The crude papain was heterogeneous on isoelectric focusing; several enzyme zones with isoelectric points in the range 9.5-10.5 were detected. The mol. wt. of the main enzyme fraction separated by gel filtration was estimated to be about 21,000. Irradiation treatment of 1% papain in aqueous solution with 2.5, 5.0 and 10.0 KGy resulted in some structural changes in the enzyme, both the size and charge properties being affected. However, no such effect was observed when papain was irradiated in the solid form with doses of 10, 20 and 30 KGy. This confirms the suitability of radiation processing for the reduction of microbial contamination of dry industrial papain preparations. AS

Microorganisms

1865 Condon (S), Lopez (P), Oria (R) and Sala (FJ). Thermal death determination. Design and evaluation of a thermoresistometer. **Journal of Food Science** 54(2); 1989; 451-457

The design and performance of a thermoresistometer (TR-SC) are described. This instrument has a high heating (5.7 C /sec) and cooling rate and can be used to determine spore survival curves at temp. up to UHT range. Spores can be heated in homogenized foods under constant monitoring of pH (plus or minus 0.001 u.pH) and stable temp. (plus or minus 0.1 C). D_1 values can be determined to 0.008 min. This method takes less time and effort than by capillaries. The fit of D_1 values to thermal death time curves (TDT) curves is better by the TR-SC than by the capillary method. Survival and TDT curves for **Bacillus licheniformis**, **Bacillus coagulans** and **Bacillus subtilis** were determined in homogenized foods and in McIlvaine buffer at temp. up to the UHT range. AS

1866 Kaul (M) and Aggarwal (G). Microbial load of common 'chat' products. **Indian Journal of Nutrition and Dietetics** 25(6); 1988; 197-199

As environment during cooking and storing of prepared foods significantly increases their microbial load this study on the microbiological quality of commonly used chat products in India has been undertaken. The popular fast foods viz. **paprichat, Bhalla chat, Bhel** puri and fruit chat sold in Chandigarh (Punjab) were collected from vendors and shops at random and the microbial load was determined. Chat products were also prepared in the lab. under strict hygienic conditions. Results showed a range from 10^{8} to 10^{10} CFU/g and 10^{3} upto 10^{7} CFU/g for total and specific microbial count for common chat products which increased after storage for 16 h and 24 h at room temp., lab. prepared chat showed lower counts. The main organisms present were **E. coli, Salmonella typhimurium, S. gallinarum, Shigella dysentriae, Pseudomonas flourescens** and **Klebsiella pneumoniae.** KAR.

Algae

Spirulina platensis

1867 Madhavi Sekharam (K), Venkataraman (LV) and Salimath (PV). Structural studies of a glucan isolated from blue-green alga **Spirulina platensis. Food Chemistry** 31(2); 1989; 85-91

The acid-soluble polysaccharide isolated from **Spirulina** contained glucose, principally, with small amounts of sulphate. The later was removed by passing through a DEAE-cellulose column. Methylation analysis, periodate oxidation, chromium trioxide oxidation. Oligosaccharide and enzymatic studies revealed the polymer to have an alpha-1, 4 linked glucan backbone with frequent side chains through alpha-1, 6 linked glucosyl residues. AS

Bacteria

Escherichia coli

1868 Scheinbach (S) and Hong (SI). Detection of resident population of **Salmonella** and **Escherichia coli** in food ingredients by plasmid analysis. **Food Microbiology** 5(4); 1988; 235-241

Isolates of **Salmonella** and **Escherichia coli** previously collected as food contaminants were characterized by plasmid analysis and antibiotic-resistance typing. Twenty-nine of 75 **Salmonella** and nine of 16 **E. coli** contained at least one plasmid. In two cases, **Salmonella** isolates collected a yr apart belonged to the same plasmid sub-group. Six **E. coli** isolates harbored a large (approx. 60 kb) plasmid. Three of these isolates, collected the same day, were shown to be in the same sub-group when digestion of each plasmid with Eco RI endonuclease yielded the same DNA fragments. These results illustrate the ability of plasmid analysis of elucidate the epidemiology of foodborne pathogens and reveal resident populations. AS

Listeria monocytogenes

1869 El-Kest (SE) and Marth (EH). **Listeria monocytogenes** and its inactivation by chlorine. A review. **Lebensmittel-Wissenschaft und-**

Technologie 21(6); 1988; 346-351

Although **Listeria monocytogenes** was known as a pathogen for decades, its role as a cause of foodborne disease has been recognized only during the last few yrs. Accordingly, much information is available about the pathogenicity of **L. monocytogenes**. There are limited studies on the effectiveness of chlorine, the disinfectant that is commonly used in the food industry, against **L. monocytogenes** and other microorganisms. This review provides some historical information about **L. monocytogenes** as well as its importance from both health and economic aspects. Information also is included about the nature and use of chlorine as a disinfectant in the food and dairy industry. Finally, a summary of the available studies on chlorine as a disinfectant effective against **L. monocytogenes** is given. AS

1870 El-Shenawy (MA) and Marth (EH). Inhibition and inactivation of **Listeria monocytogenes** by sorbic acid. **Journal of Food Protection** 51(11); 1988; 842-847

Inhibition and inactivation of **Listeria monocytogenes** by sorbic acid were studied using tryptose broth supplemented with 0, 0.05, 0.1, 0.15, 0.2, 0.25, or 0.3% potassium sorbate; adjusted to pH 5.6 or 5.0; and incubated at 4, 13, 21 or 35 C. The bacterium grew in sorbate-free controls under all conditions except at 4 C and pH 5.0. At pH 5.6 and 4 C the bacterium was inactivated by 0.25 or 0.3% of potassium sorbate after 66 and 60 d. Other concn. permitted slight growth followed by decreases in populations. At 4 C and pH 5.0 concn. of 0.15 to 0.3% potassium sorbate completely inactivated the pathogen in 60 to 36 d, whereas the other concn. caused a gradual decrease in populations during the incubation period. At 13 C and pH 5.6 **L. monocytogenes** grew at all test concn. of potassium sorbate, but the max. populations were directly related to the concn. of potassium sorbate added to the medium the higher the concn. the lower the ultimate max. population. At 13 C and pH 5.0, concn., of 0.2, 0.25, or 0.3% potassium sorbate completely inhibited growth and caused complete inactivation of the pathogen, whereas presence of 0.15% or less potassium sorbate allowed growth of the pathogen. At 21 and 35 C and pH 5.6 appreciable growth of **L. monocytogenes** occurred at all test concn. of sorbate. Reducing the pH to 5.0 allowed limited growth of the pathogen at 21 and 35 C when the medium contained 0.05, 0.1 or 0.15% potassium sorbate. Higher concn. caused either complete inhibition or inhibition plus partial or complete inactivation of **L. monocytogenes**. AS

1871 Pini (PN) and Gilbert (RJ). A comparison of two procedures for the isolation of **Listeria monocytogenes** from raw chickens and soft cheeses. **International Journal of Food Microbiology** 7(4); 1988; 331-337

A cold enrichment method and a modified FDA procedure were compared for the isolation of **Listeria monocytogenes** from raw chickens and soft cheeses. **L. monocytogenes** was isolated from a total of 23 of 222 cheese and 70 of 160 chicken samples by either one or both methods. Neither method alone yielded all isolates from the two food types. Only 12 cheese and 13 chicken samples were shown to be positive by both methods, although the serotype isolated were not always identical. On some occasions one method yielded **L. monocytogenes** while the other produced a different **Listeria** sp. Reasons for differences in the performance of the two procedures and various points of technical interest are discussed. AS

Salmonella

1872 D'Aoust (J-Y) and Sewell (AM). Reliability of the immunodiffusion 1-2 test system for detection of **Salmonella** in foods. **Journal of Food Protection** 51(11); 1988; 853-856

The novel 1-2 Test^{TM} is a self-contained tetrathionate enrichment and immunodiffusion-agglutination reaction vial for the detection of **Salmonella** in preenrichment and direct enrichment cultures of processed and non-processed foods, resp. Of 186 foods tested, 46(24.7%) were found to contain salmonellae by all analytical conditions combined. The standard cultural procedure identified 43(93.5%) contaminated samples whereas the 1-2 Test^{TM} system detected 20 (43.5%) and 25 (54.3%) positive samples after 8 h and 24 h of incubation, resp. Although six false positive reactions were obtained after short (8 h) incubation of test vials, homologous reactions were not detected after 24 h incubation. System deficiency likely stems from the low selectivity of applied cultural conditions and inability of the 1-2 Test^{TM} to detect salmonellae in the presence of large numbers of competing microflora. AS

Streptococcus

1873 Magnus (CA), McCurdy (AR) and Ingledew (WM). Evaluation of four media for recovery of heat-stressed streptococci. **Journal of Food Protection** 51(11); 1988; 895-897

Two strains of **Streptococcus faecium** and one strain of **Streptococcus faecalis** were subjected to heat stress in a ham broth and recovered on all purpose tween agar; deMan, Rogosa, Sharpe agar; tryptone-dextrose-yeast extract-meat extract-peptone agar; and tryptic soy agar. Survival curves for the organisms recovered on each agar were constructed and D values (death rates) were calculated. Differences in death rates were noted for each organism between different media. The greatest recovery of cells that had received sub-lethal heat treatment occurred using all purpose tween agar. AS

Fungi

Mushrooms

1874 Beelman (RB), Barden (CL) and Edwards (CG). Total sulphur dioxide residuals in fresh mushrooms washed in sulphite solutions. **Journal of Food Protection** 51(11); 1988; 903-905

Freshly-harvested, cultivated mushrooms (**Agaricus bisporus**) were washed in 1000 p.p.m. solutions of sodium sulphite and stored in ventilated, polyvinylchloride film-overwrapped packages at 5 and 15 C. Total sulphur dioxide of the mushrooms was measured by the modified Monier-Williams procedure numerous times during a 48-h storage period. Initial sulphur dioxide averaged 48.1 p.p.m. and subsequently declined at a logarithmic rate. Total sulphur dioxide fell below detectable levels (< 10 p.p.m.) at about 11.8 and 15.6 h at 15 and 5 C, resp. AS

1875 Pandey (MC) and Aich (JC). Equilibrium moisture content of dehydrated mushroom (**Pleurotus sajor caju**). Journal of Food Science and Technology, India 26(2); 1989; 108-109

Equilibrium moisture content (EMC) of dehydrated mushroom (**Pleurotus sajor caju**) was determined at five levels of temp. ranging from 10 to 50 C and relative humidity ranging from 30 to 95% using static desiccator technique. For the safe storage of mushroom, the humidity and temp. are so prescribed as to have the corresponding equilibrium moisture. Four isotherm equation viz., Harkin's and Jura, Smith's Henderson's and Chung and Pfost's were examined using the data obtained. It was found that Smith's equation gave the best fit over the entire range of relative humidity and temp. Free energy change and heat vapourization of mushroom decreased as the moisture and temp. increased. Mould growth was observed at relative humiditiy greater than 80%. AS

Hygiene

Listeria monocytogenes

1876 Petran (RL) and Zottola (EA). A study of factors affecting growth and recovery of **Listeria monocytogenes** Scott A. Journal of Food Science 54(2); 1989; 458-460

The growth parameters for **Listeria monocytogenes** Scott A at various temp., pH values, water activity values, and in different carbohydrates were assessed. Growth was seen from 4 C through 45 C and at pH values from 4.7 through 9.2. Generation times were calculated for each parameter at which growth was observed. Optimum growth was defined as shortest generation time L. monocytogenes grew optimally over the temp. range 30-37 C. The optimum pH was 7.0. Growth was demonstrated in solutions of up to 39.4% sucrose (water activity of 0.92). Carbohydrate fermentation was variable. Further studies involved examination of growth at optimal water activities (0.97) with suboptimal temp. and pH values, and at 7.0 with suboptimal temp. and water activities. Growth was seen when these parameters were combined. AS

Pseudomonas fragi

1877 Herald (PJ) and Zottola (EA). Effect of various agents upon the attachement of **Pseudomonas** fragi to stainless steel. Journal of Food Science 54(2); 1989; 461-464

Epifluorescent microscopy was used to assay for the effect of selected chemicals and enzymes upon physical attachement of **Pseudomonas fragi** to stainless steel. The assay were conducted after the pretreatment of cells with the agents, in the presence of agents, and in the removal of attached cells with test agents. Compared to the controls, sodium periodate, cetyltrimethylammonium bromide (Cetavlon), NaOH, and Concanavalin A inhibited the attachment process in the pretreatment and presence assays. Trypsin, sodium dodecyl sulphate (SDS), NaOH and sodium periodate were effective in removing attached cells, while Cetavlon and Triton X-100 stabilized the attachement of cells to the stainless steel surface and prevented their removal. Neither EDTA nor mechanical removal of flagella had a significant effect upon attachement. These results suggested that attachement of P. fragi to stainless steel involved a polysaccharide and protein matrix surrounding the cells. AS

Staphylococcus aureus

1878 Sudhakar (P), Nageswara (R), Bhat (RV) and Gupta (CP). The economic impact of a foodborne disease outbreak due to **Staphylococcus aureus. Journal of Food Protection** 51(11); 1988; 898-900

The economic cost of a **Staphylococcus aureus** outbreak involving over 100 persons was estimated. About 41% of the expenditure was borne by the affected persons which includes, loss of wages or productivity loss and other expenses. The cost of hospitalization, lab. investigations, etc., was 43%. Educative and preventive measures would considerably reduce the economic cost of the outbreaks which are very high for a developing economy. A comparison of the economic cost calculated on the basis of %of per capita income with that of a similar outbreak in the United States indicated that the cost of a foodborne disease outbreak is higher in India than in the United States.. AS

BIOTECHNOLOGY

Nil

TISSUE CULTURE

1879 Burger (DW). Guidelines for autoclaving liquid media used in plant tissue culture. HortScience 23(6); 1988; 1066-1068

As liquid vol. between 10 and 4000 ml differed in the time required to reach 121 C by 40 min, it was monitored with solid state temp. probes during autoclaving cycles. It was observed that preheating solutions before autoclaving slightly reduced the time required to reach sterilizing temp. BAP

1880 Nagasawa (A) and Finer (JJ). Induction of morphogenic callus cultures from leaf tissue of garlic. HortScience 23(6); 1988; 1068-1070

Regenerated plantlets from callus were obtained from young leaf using five auxeins in the order of decreasing effectiveness. Napthalene acetic acid (NAA) did not induce any morphogenesis even over a wide range of concn. Various concn. of auxins have been described in detail. BAP

FOOD ADDITIVES

1881 LeBlanc (DT) and Akers (HA). Maltol and ethyl maltol. From larch tree to successful food additive. Food Technology 43(4); 1989; 78-84

Maltol is isolated from bark of larch tree (**Pinus larix** Linn). The maltol enhance or modify the flavour and aroma of foods and beverages for heightened consumer appeal. They have outlasted other food additives, because, in addition to being powerfully effective at low concn. GAR

Colourants

1882 Talati (JD) and Patel (AS). Corrosion of copper by food colourants. **Indian Journal of Technology** 26(12); 1988; 588-594

At 0.025% concn. the corrosion of copper by aqueous solutions of food dyes increases in the order: erythrosine < indigo carmine < sunset yellow < tartrazine < fast red E < amaranth < ponceau 4R < carmoisine, with the corrosion potentials ranging form -80 mV to -95 mVvs SCE. Corrosion rate increases slightly with temp.; the increase being about 25% with a 10 C rise in temp. The corrosivity of 0.1 N aqueous solutions of different acids containing the colourants is found to increase in the order: tartaric < lactic < malic < citric < acetic. Synthetic mango effect when added to amaranth, fast red E and ponceau 4R. The corrosion of six azo dyes may be traced to complex formation and the presence of sulphonic acid groups in the molecule. KAR

CEREALS

1883 Hauschild (AHW), Hilsheimer (R), Weiss (KF) and Burke (RB). **Clostridium botulinum** in honey, syrups and dry infant cereals. **Journal of Food Protection** 51(11); 1988; 892-894

A total of 150 honey, 43 syrup and 40 dry cereal samples were analyzed for **Clostridium botulinum** spores, each in triplicate quantities of 25 g. The foods were sampled randomly, except for two lots of honey which were potentially associated with illness. Botulinal spores were detected in a sample of honey associated with infant botulism and in a single sample of rice cereal.. AS

1884 Milton (RF) and Pawsey (RK). Spoilage relating to the storage and transport of cereals and oilseeds. **International Journal of Food Microbiology** 7(3); 1988; 211-217

Cereal grains were liable to damage during shipment as a result of mould growth that generates both heat and moisture. Such heating, like that for insect infestation, results in moisture migration that can cause damage to other parts of the stow. Increasing storage temp. may also increase equilibrium relative humidity (ERH) above the threshold for mould growth. To avoid damage, the initial water content and the loading temp. have to be considered together to prevent any part of the stow exceeding this threshold. Temp. differences between the centre of the grain and its periphery, whether due to mould or insect heating, shipboard sources of heat or decreasing ambient temp, must be minimised and the period of time from loading to discharge kept as short as possible. AS

1885 Paster (N) and Bullerman (LB). Mould spoilage and mycotoxin formation in grains as controlled by physical means. **International Journal of Food Microbiology** 7(3); 1988; 257-265

Low O concn. (< 1%) and/or increased concn. of carbon dioxide or N have been found to be highly effective in preventing the development of mould on grain and in inhibiting selected mycotoxins, e.g. aflatoxin, ochratoxin, patulin, penicillic acid and T-2. However, the levels of carbon dioxide needed to inhibit mould growth are much higher than those required for the inhibition of mycotoxin production. The degree of inhibition achieved by elevated carbon dioxide concn. is dependent on other environmental factors, such as relative humidity (RH) and temp. Nevertheless, the biosynthetic pathways for mycotoxin production are merely blocked, but not damaged by high carbon dioxide levels. Irradiation has been shown to destroy the conidia of moulds but the information concerning the effect of irradiation on mycotoxin formation seems to be contradictory. Aflatoxin production was increased in irradiated wheat grain, but decreased in barley and maize when the grain was irradiated prior to inoculation. The number of spores in the inoculum, grain condition, relative humidity and other environmental factors could all affect the results obtained. However, ochratoxin formation by **Aspergillus ochraceus** was consistently enhanced by irradiation of spores or mycelium. AS

1886 Sauer (DB). Effect of fungal deterioration on grain. Nutritional value, toxicity, germination. **International Journal of Food Microbiology** 7(3); 1988; 267-275

Moulds or fungi that grow in grains and seeds during storage and transport cause germination decrease, visible mouldiness, discolouration, musty or sour odours, caking, chemical and nutritional changes, reduction in processing quality, and form of mycotoxins. These deteriorative changes affect the grade and price of grain and contribute to customer dissatisfaction when the grain is marketed. The respiration of grain and fungi results in a loss in dry matter as well as the production of heat and moisture which contributed to further spoilage. Net changes in nutritional value and the risk of mycotoxin contamination are difficult to predict because they depend on a complex iteraction of factors such as temp./ moisture/ storage time/ fungal sp. comp./ kind of grain/ and previous storage history. Moisture is the most important variable determining the rate of deterioration caused by fungi/ with temp. being the second major factor. Problems with deterioration of grain in export shipments are not a recent development. They are related primarily to grain moisture at loading/ and also to the extent of previous mould invasion. AS

1887 Udayasekhara Rao (P) and Sharma (Rd). Effect of fenugreek seeds (**Trigonella foenum graecum**) supplementation on the protein quality of rice (**Oryza sativum**)/ wheat (**Triticum astivum**) and jowar (**Sorghum vulgare**). **Food Chemistry** 31(2); 1989; 139-148

Defatted fenugreek seed (DEF) when added at the 5% and 10% levels did not improve the protein quality of rice diets/ but when added to wheat and jowar diets of rats/ they increased the gain in body wt./ food intake/ PER and NPU values. Dry matter and protein digestibilities were slightly decreased. Lysine present in the fenugreek seems to play an important role in improving the quality of staples tested in this study. AS

Paddy

1888 Unnikrishnan (KR) and Bhattacharya (KR). Reviving the pressure-parboiling process by use of low-amylose varieties of paddy. **Indian Food Industry** 8(1); 1989; 25-28

The pressure-parboiling process/ developed in Paddy Processing Research Centre (Tiruvarur)/ had outstanding technological advantages and was widely adopted in Punjab. But the process was given up as it evoked strong consumer resistance/ for the rice became very hard and difficult to cook. The present studies showed that the excessive hardness of pressure-parboiled rice was characteristics of high-amylose rice var. commonly grown in India. But low- or intermediate-amylose rice after pressure parboiling gave relatively soft-cooking and acceptable rice. Such var. have been breed in Punjab. The pressure-parboiling industry can be revived in these var. are used. AS

Rice

1889 Paule (CM) and Powers (JJ). Sensory and chemical examination of aromatic and nonaromatic rices. **Journal of Food Science** 54(2); 1989; 343-346

Two different panels were trained to evaluate the character of four aromatic and two nonaromatic rices. The judges used terms with which they were familiar to describe the odour of aromatic rice: pandan for the orientals and popcorn for the nonorientals. The rice volatiles were separated by a gas chromatograph equipped with a packed column and a sniffing port. The peaks possessing the aromatic principle were identified by GC-MS and correlated with the desirable aroma terms. 2-Acetyl-1-pyrroline showed highly significant positive correlations with the descriptive terms; hexanol showed negative correlations. AS

1890 Reyes (VGJr) and Jindal (VK). Conduction heating of high moisture rough rice. 1. Thermal inactivation of fungi. **Journal of Food Process Engineering** 10(4); 1989; 231-248

In this study the time-temp. requirements to achieve the desired levels of fungal mortality in freshly harvested high moisture rough rice by thermal inactivation are presented using the bulk grain temp. as a reference. An experimental batch type rotary heating unit was used for these studies which showed that the heat treatments significantly reduced fungal activity in rough rice as measured by dilution plating and carbon dioxide production. NGKR

1891 Wouters (A) and de Baerdemaeker (J). Effect of moisture content on mechanical properties of rice kernels under quasi-static compressive loading. **Journal of Food Engineering** 7(2); 1988; 83-111

This work was carried out to collect data on the mechanical properties of rice kernels for engineering calculations, to investigate the influence of moisture content on those properties and determine the influence of rice var., rice form (treatment) and compression speed on these properties. The statistical analysis of the test results revealed that moisture content had great influence on the properties examined especially in the range of 12% - 18% (dry basis) where quite drastic changes occur. In terms of bound water and free water in the kernel an explanation has also been given. NGKR

Rice bran

1892 Ramakrishna (P), Subramanian (R), Monohar (B) and Venkatesh (KVL). Moisture content, strength and extractability of rice bran pellets. **Journal of Food Engineering** 7(4); 1988; 281-287

The results of study to find out the causes for rice bran pellets becoming dry and hard during storage were discussed in this paper. An equation relating to breaking strength (H) of pellets to moisture content (M); initial strength (H_o) initial moisture content with K as constant viz. $H-H_o = K(M_o - M)$ was proposed. It was found that with hardness the oil extraction decreased by about 2% from the pellets during the initial period of 20 min. It was also seen that strength did not have any significant effect on the oil extraction with only 0.2% after period of 140 min extraction. NGKR

Wheat

1893 Bakhshi (AK), Saxena (AK), Sharma (AK), Raheja (RK) and Sekhon (KS). Lipid and fatty acid composition of bread wheats, durum wheats and triticale. **Indian Journal of Nutrition and Dietetics** 25(6); 1988; 188-196

In this study 5 var. each of bread wheat ('WL 711', 'SKAML 1', 'PBW 12', 'PBW 65', 'WL 2265'), durum wheat ('PBW 34', 'PBW 114', 'PBW 115', 'PBW 117', 'DWL 5023') and triticale ('TL 419', 'TL 688', 'TL

1210', 'TL 1771', 'TL 1969') were included. Results showed that of the two wheat sp. (T. **aestivum** and **T. durum**) and triticale bread wheats had relatively higher amount of total, free, polar and non-polar lipids. The palmitic and linoleic acids were highest in the saturated and unsaturated fatty acids and bread wheats had higher quantities of these two acids as compared to durum wheats and triticale. Durum wheat had significantly less amount of free lipids, bound lipids and arachidonic acid than bread wheat and triticale. As compared to triticale a significantly higher amount of stearic acid was found in durum wheat. NGKR

1894 Rasco (BA), Hashisaka (AE), Dong (FM) and Einstein (MA). Sensory evaluation of baked incorporating different levels of distillers dried grains with solubles from soft white winter wheat. **Journal of Food Science** 54(2); 1989; 337-342

Baguettes, cinnamon rolls, and chocolate chip cookies containing 0, 12.5% or 25% distillers dried grains with solubles (DDGS) from soft white winter wheat substituted for flour (w/w) were evaluated by an experienced panel to determine how much DDGS could successfully be incorporated into baked products. Panelists were unable to differentiate control cookies from those containing 12.5% DDGS. Attribute analyses of 7 flavour and 4 texture traits were conducted, and overall acceptability was determined for products found to be different in their sensory properties. Both the control and experimental cinnamon rolls and chocolate chip cookies were rated as highly acceptable. The baguettes containing DDGS were found to be less acceptable than the control because of a stronger flavour and/or off-flavour. AS

MILLETS

Corn

1895 Fields (ML), Al-Shoshan (A) and Poosiri (Y). Mixed culture fermentations to improve nutritional value of corn meal. **Journal of Food Protection** 51(11); 1988; 866-868

One-step fermentation involving two microorganisms inoculated at the same time and two-step fermentation involving two inoculations of different microbes at different times were used to enrich corn meal. Starch in corn meal was first hydrolyzed by amylases of **Bacillus stearothermophilus Escherichia fibuligera** or **Aspergillus oryzae** followed by the growth of **Candida utilis**. The combination of **E. fibuligera** and **C. utilis** produced a significant ($P < 0.05$) increase in lysine, methionine, tryptophan. The relative nutritive value (%), which reflected the amino acid balance, increased significantly ($P < 0.05$) with this sequence of microorganisms. Niacin, riboflavin, and thiamin increased significantly ($P < 0.05$) when mixed cultures of **A. oryzae** and **E. fibuligera** in combination with **C. utilis** were employed. When **E. fibuligera** alone was grown no significant change was observed in thiamin content but significant increases occurred in niacin and riboflavin. **A. oryzae** by itself produced significant ($P < 0.05$) changes in niacin, riboflavin and thiamin. AS

1896 Tolaba (MP), Viollaz (PE) and Suarez (C). A methematical model to predict the temperature of maize kernels during drying. **Journal of Food Engineering** 8(1); 1988; 1-16

A model representing the temp. changes in maize grain drying has been developed. The model has the principal advantage of having an analytical solution, requiring only the drying curve and the physical properties of the grain. The validity of the model was tested experimentally, and the agreement between calculated and experimental temp. profiles was satisfactory. AS

Corn meal

1897 Liu (C-Y) and Fields (ML). Production of pantothenic acid by microorganisms isolated from fermented corn meal. **Journal of Food Protection** 51(11); 1988; 906-907

Seven strains of microorganisms out of 35 examined produced pantothenic acid. These included 3 strains of **Bacillus licheniformis**, 3 strains of **Enterobacter cloacae** and 1 strain of **Hansenula subpelliculosa**. Microorganisms not producing pantothenic acid included; **Streptococcus faecalis**, **Lactobacillus brevis**, **Moraxella** sp., **Pseudomonas** sp. and **Agrobacterium** sp. The non-producers could not use β-alanine or pantoyl lactone or a combination of the two molecules which constitute pantothenic acid. Addition of sucrose (2%) to the nutrient broth reduced pantothenic acid production by about 68%. Control corn meal contained 0.44 plus or minus 0.02 mg pantothenic acid/100g, whereas fermented corn meal contained 1.84 plus or minus 0.16 mg/100 g after 3 d and 1.48 plus or minus 0.5 mg/100g after 5 d of fermentation. AS

Pearl millets

1898 Neelam Khetarpaul Chauhan (BM). Microbial composition of naturally fermented pearl millet (**Pennisetum typhocideum** flour. **Indian Journal of Microbiology** 29(2); 1989; 143-145

Natural fermentation of raw and autoclaved pearl millet flour (PMF) was done at 20, 25 and 30 C for 72 h. In both, the pH was the lowest and titrable acidity was highest when fermentation was carried out at 30 C. During fermentation, the microbial comp. of the PMF underwent qualitative and quantitative change. The initial and final number of all types of microflora of autoclaved fermented flour were less than that of unautoclaved fermented flour. Lactobacilli were the most dominating followed by yeasts, coliforms and fungi. Growth of all types of microflora was max. at 30 C. AS

1899 Panwal (JH) and Pawar (VD). Effect of depigmentation of pearl millet on rheological properties of flour and sensory quality of roti. **Journal of Food Science and Technology, India** 26(2); 1989; 110-112

The rheological properties of flour of pearl millet soaked in

0.2 N HCl for 24 hr and sensory quality of roti were studied. The viscosity (cold paste) increased on heating to 90 C (hot paste) and subsequently on cooling to 30 C (cooked paste) in both the untreated and HCl-treated flour samples. The solubility and swelling powers of both the samples increased slowly upto 60 C, but beyond that, the increase was significant. In general, decrease in viscosity and increase in solubility and swelling power was observed in HCl-treated sample. The HCl-treated pearl millet flour roti showed improved colour, texture and taste but inferior aroma (41%). However, the overall quality was not adversly affected. AS

1900 Panwal (JH) and Pawar (VD). Effect of soaking pearl millet in acid on the bleaching and functional properties of flours. Journal of Food Science and Technology, India 26(2); 1989; 79-82

Pearl millet was soaked in 0.2 N HCl for 3, 6, 9, 12, 15, 18 and 24 h and bleaching and functional properties of flours were studied. It was observed that HCl was the most efffective bleaching agent which removed pigments to the extent of 74.3% during 24 h soaking time. The functional properties of flours viz. water and oil absorption capacities of HCl treated flours were improved at all soaking times. N solubility, gelation, foam capacity and foam stability, emulsifying activity and its stability and bulk density were decreased after soaking pearl millet in 0.2 N HCl. AS

Ragi

1901 Harinder (K), Singh (T) and Bains (GS). Study of the effect of finger millet (Eleusine coracana) and wheat malts in breadmaking. Journal of Food Science and Technology, India 26(2); 1989; 95-98

PULSES

1902 Della Gatta (C), Piergiovanni (AR) and Perrino (P). An improved method for the determination of trypsin inhibitor levels in legumes. Lebensmittel-Wissenschaft und-Technologie 21(6); 1988; 315-318

Trypsin inhibitor levels in seed legumes can be determined by measuring the loss of activity of added trypsin in the presence of synthetic substrate (BAPH) using a glycine buffer, pH 11 containing urea and EDTA, to extract trypsin inhibitor to solve some of the problems encountered with kakade's method currently used. This new method is recomended when a large numbers of samples has to be analysed since a single measurement in the appropriate range is enough for each sample. BHSR.

1903 Ukhun (ME) and Ifebigh (EO). Chemical analysis of Centrosema pubescence legume seeds. Journal of Food Biochemistry 12(4); 1989; 261-267

The amino acid and fatty acid comp. of the seeds of the wild Nigerian legume Centrosema pubescence have been determined, along with proximate comp. and levels of selected inorganic ions. Total unsaturation of the lipid extract amounted to about 59% with oleic acid being not only the dominant unsaturated fatty acid, but also the overall single dominant fatty acid. The first limiting amino acid was methionine. Lysine was present at a level higher than in the reference egg protein. The proximate comp. was characterized by high protein and crude fiber contents (21 and 9.7%, resp.) and by low crude fat (about 2.3%) and ash contents (about 3.5%). Varying levels of selected inorganic ions were also detected. AS

Beans

1904 Paredes-Lopez (O), Schevenin (ML), Guevara-Lara (F) and Barradas (I). Thermal inactivation of haemagglutinating activity of normal and genetically-improved common bean varieties. A kinetic approach. Food Chemistry 31(2); 1989; 129-137

Two cvs of Phaseolus vulgaris FM-RMC, showing resistance to some plant pathogens and its progenitor, FM-C, without such resistance, were used to study the thermal inactivation of seed haemagglutinating activity (HA). FM-RMC showed a higher level of HA as compared to the FM-C. However, conventional cooking conditions practically abolished HA of both materials. Thermal inactivation of raw extracts of lectins showed biphasic patterns. A developed kinetic model fitted the experimental observations and showed that the HA loss rate of the improved cv differed only in a temp. constant. AS

1905 Plhak (LC), Caldwell (KB) and stanley (DW). Comparison of methods used to characterize water inbibition in hard - to - cook beans. Journal of Food Science 54(2); 1989; 326-329

The traditional gravimetric and volumetric methods of measuring water imbibition were compared to a new method, water-holding capacity(WHC), to study water uptake in black bean cotyledons with and without the hard-to-cook defect. Water-holding capacity was found to be more reliable in measuring water taken up by the cotyledon since the former methods measure gross water uptake, including a layer of bulk water existing between the seedcoat and cotyledons of hard-to-cook beans. Total water uptake, as measured by the water absorption method, was greatest for hard-to-cook beans. Using the WHC method, however, hard-to-cook beans were found to bind approx. 25% less water during soaking than control beans. AS

Dry beans

1906 Srisuma (N), Hammerschmidt (R), Uebersax (MA), Ruengsakulrach (S), Bennick (MR) and Hosfield (GL). Storage induced changes of phenolic acids and the development of hard-to-cook in dry beans (Phaseolus vulgaris, var. Seafarer). Journal of Food Science 54(2); 1989; 311-314

Navy beans were stored for 9 months under 3 conditions (5 C/40% RH, 20 C/73% RH, and 35 C/80% RH) to produce different degrees of hard-to-cook (HTC) defect. Changes in free hydroxycinnamic acids, hexane soluble and methanol soluble hydroxycinnamic acids, cell wall bound hydroxycinnamic acids, and lignin content were determined. Storage induced HTC beans contained higher levels of hydroxycinnamic acids (especially ferulic acid) than the control beans in all fractions prepared from seed coats and cotyledons except for the methanol soluble and cell wall bound phenolic acid fractions from cotyledons. No significant changes in lignin content were detected among the treatments. Large increases in free hydroxycinnamic acid content associated with increased hardening, suggest a relationship between these two factors. AS

Faba beans

1907 Ng (PKW), Hoehn (E) and Bushuk (W). Sensory evaluation of binding of vanillin by fababean proteins. Journal of Food Science 54(2); 1989; 324

Sensory studies were conducted to estimate the perceived vanillih flavour of protein-vanillin systems that contained free vanillin and vanillin bound to faba bean protein micellar mass (PMM). Nine panelists used the magnitude estimation technique to evaluate vanillin flavour by tasting. A power function was established from a series of different concn. of vanillin solutions versus their respective sensory estimates of vanillin flavour and used to convert sensory estimates to perceived vanillin concn. of the vanillin-PMM slurries. The perceived vanillin in vanillin-PMM systems was directly related to the free vanillin in the corresponding system as determined by HPLC, indicating that only the free vanillin contributed to the flavour. Thus, instruments can be used to predict human perception of a particular flavourant in a food system of flavour protein interactions. AS

Great Northern beans

1908 He (F), Purcell (AE), Huber (CS) and Hess (WM). Effects of calcium, sucrose, and aging on the texture of canned great Northern beans (Phaseolus vulgaris L.). Journal of Food Science 54(2); 1989; 315-318

Factors affecting hardness of canned great Northern beans (**Phaseolus vulgaris** L.) were investigated. Addition of Ca significantly increased the hardness of processed beans; however, the Ca content usually found in hard culinary water supplies did not cause good quality beans to be unacceptably hard when processed. Firmer processed beans had a higher Ca uptake and lower water absorption. Sucrose increased the hardness of processed beans. Sucrose and Ca were synergistic in their firming action. Beans stored at high temp. and humidity for a prolonged period of time became firmer when processed and more sensitive to Ca hardening and to the synergistic effects of Ca and sucrose. AS

Green peas

1909 Kalra (CL), Kulkarni (SG), Beerh (OP), Sharma (TC), Sehgal (RC), Dhillon (GS) and Sharma (BR). Studies on the post-harvest storage of green pea cultivars as influenced by pre-packaging. Indian Food Packer 43(3); 1988; 18-26

Green peas cv. ('Pb-87', 'Pb-88', 'Sel-3487' and 'Bonneville') packed in perforated 200 gauge LDPE bags (30 x 25 cm size) and stored separately at room temp. (13-30 C, RH 40-75%) and at low temp. (8-10 C, RH 85-90%) were assessed for shelf-life and consumer acceptability. The shelf-life of pre-packed and room temp. stored peas extended up to 6 days for Pb-87, 4 days for Pb-88 and Sel 3487 and 2 days for Bonneville. In low temp. the shelf-life of pre-packed peas increased from 2 to 20 days for var. Pb-87 and Pb-88. KAR

Horsegram

1910 Vijaya Khader Venkat Rao (S). Note on composition of lipid and alcohol soluble factors in horsegram (**Macrotyloma uniflorus** Medik) seed. **Andhra Agricultural Journal** 35(1-2); 1988; 163-164

Raw horsegram (**Macrotyloma uniflorus** Medik) seed contained 0.028 and 0.029% of lipid (ether) soluble and alcohol soluble factors resp. The major fatty acids in lipid soluble factor were palmitic acid (22%), oleic acid (20%) linoleic acid(42%), and linolenic acid (11%). The antitryptic activity of raw horsegram was 24.0 x 10^{-3} trypsin inhibitor units per 0.1 g material. Lipid soluble factor contained more inhibitor (200 x 10^{-3} units per 0.1 g material) than the alcohol soluble factor (142.9 x 10^{-3} units per 0.1 g material). Haemagglutinin was absent in horsegram. KAR

OILSEEDS AND NUTS

Almonds

1911 Moreira (RG), Castell-Perez (FE) and Bakker-Arkema (FW). Dehydration of almonds at high temperatures. **Revista de Agroquimica y Tecnologia de Alimentos** 28(4); 1988; 509-518 (Es).

The drying of almonds in a new commercial high-temp. dryer (90-110 C) was analyzed. The drying characteristics of individual parts of almond fruit were obtained, and a mathematical model was selected to describe thin-layer drying of almonds. AS

Arecanuts

1912 Patil (RT). Drying studies on arecanut (**Areca catechu** Linn). **Journal of Food Science and Technology, India** 26(2); 1989; 106-107

Ripe arecanut fruit is dried for 6-7 wks to recover dried arecanut kernel by dehusking. During this prolonged period fungus infestation upto 10-15% is quite common. Therefore, accelerated drying technique like use of solar dryer and natural convection agricultural waste fuelled dryer were studied in comparison to open sun-drying. In the solar dryer, spreading density was 50 kg/m ^{2} compared to 15 kg/m^2 in open sun. A saving in time by 10 days (25%) was observed without any deterioration in quality. The not air dryer takes 10 times more capacity and drying was achieved within 10 days.

Use of hot air dryer using agricultural waste as fuel is, therefore, economically feasible for arecanut drying also. AS

Cashew nuts

1913 Rangaswamy (JR) and Sasikala (VB). Phosphine residues in cashew nuts and wheat. **Lebensmittel-Wissenschaft und-Technologie** 21(6); 1988; 324-327

Bound residues of phosphine are not encountered in wheat due to a single fumigation at the dose of 6 tablets/ton, exposed for one and two wks. The behaviour of phosphine in cashew even at this lower dose is the same as that observed at higher dosages. Phosphine does not form bound residues in cashew and is held by the lipids. Oxidation of phosphine residue is more in wheat than in cashew as indicated by the higher P content in wheat than in cashew. AS

Groundnuts

1914 Mandvikar (SS). A new groundnut decorticator. **Indian Farming** 38(9); 1988; 33

Discusses a new low cost hand-operated groundnut decorticator developed at the Central Institute of Agricultural Engineering, Bhopal. BV

1915 Santos (BL), Resurreccion (AVA) and Garcia (VV). Quality characteristics and consumer acceptance of a peanut based imitation cheese spread. **Journal of Food Science** 54(2); 1989; 468-471

Six formulations of an imitation cheese spread were prepared by mixing cheese flavouring, colouring, salt and buttermilk powder into a bland, light coloured peanut paste. Three levels of flavouring (4, 6 and 8%) and two levels of salt (0.5 and 1.0%) were used. Hedonic responses of 200 Filipino consumers to the formulations were obtained. Results indicated that of the six formulations two (4% flavouring/1% salt and 6% flavouring/0.5% salt) were preferred. Compositional analysis, instrumental texture and colour of the formulations and three commercial cheese spreads were determined. Compared to commercial cheese spreads; the peanut-based samples had higher protein and oil contents and lower moisture indicating a more nutritious, potentially shelfstable product. AS

Pecans

1916 Hao (DY-Y), Heaton (EK) and Beuchat (LR). Microbial compositional and other quality characteristics of pecan kernels stored at -20 C for twenty five years. **Journal of Food Science** 54(2); 1989; 472-474

Sensory, microbial, and compositional characteristics of pecans hermetically sealed in cans and stored at -20 C for 25 yr were compared to those of pecans harvested in 1986 and stored at -20 C for 10 months. Total aerobic and yeast/mold populations were $10^2 - 10^3$ CFU/g in stored and 1986 crop nuts. Peroxides were not detected, and no difference in iodine values and free fatty acid contents were observed between 24 yr old and 1986 crop nuts. Although subjective analyses revealed that texture changed during storage, other sensory quality characteristics (colour, flavour, appearance) were not different from pecans harvested in 1986, It is concluded that low temp. (-20 C) storage will maintain quality of pecans packaged in hermetically sealed under ambient air in containers for up to 25 yr. AS

Rapeseeds

1917 Naczk (m) and Shahidi (F). The effect of methanol-ammonia-water treatment on the content of phenolic acids of canola. Food Chemistry 31(2); 1989; 159-164

The contents of free esterified and insoluble-bound phenolic acids of meals produced by methanol ammonia water/hexane treatment of canola seed were determined and compared with those of hexane-extracted meal. Ground seeds were extracted by the two-phase solvent extraction system consisting of 10% ammonia in methanol or 10% ammonia in methanol containing 5% water, and hexane as the second phase. The two-phase solvent extraction system removed 82% and 50% of the esterified and free phenolic acids originally present in the seed, resp. However, the concn. of insoluble-bound phenolic acids was not affected. AS

1918 Tikkoo (AK), Agrawal (US), Gupta (DK) and Singh (BPN). Cost analysis of expeller processing of rapeseed. Indian Food Industry 8(1); 1989; 1-12

The development of a mathematical model to analyse the cost of oil expelling process is presented. Covers economic analysis of oil expelling process considering variable oil expeller capacity, different operating hrs and fluctuation in oilseeds price. BV

Safflowers

1919 Paredes-Lopez (O), Ordorica-Falomir (C) and Carabez-Trejo (A). Production of safflower protein isolates. Physicochemical characterization. Lebensmittel-Wissenschaft und-Technologie 21(6); 1988; 328-333

Proteins were isolated from safflower meal defatted in the lab. and from safflower cake provided by an industrial plant. Isolates were obtained by micellization and isoelectric precipitation; protein yields were higher for isoelectric precipitation. Physicochemical properties of the isolates were very different as shown by differential scanning calorimetry, Hunter colour, water solubility, and scanning electron microscopy. In general, protein samples obtained by micellization had bettre properties than proteins from isoelectric precipitation. However, both procedures produce safflower protein isolates with desirable food attributes. AS

Soybeans

1920 Nout (MJR), Notermans (S) and Rombouts (FM). Effect of environmental conditions during soybean fermentation on the growth of Staphylococcus aureus and production and thermal stability of enterotoxins A and B. International Journal of Food Microbiology 7(4); 1988; 299-309

During temph manufacture, Staphylococcus aureus was able to survive in newly started soybean soaks (final pH 4.7), whereas it died during soaks with accelerated souring (final pH 4.0). No S. aureus were detected after subsequent heat treatment of soaked beans. S. aureus strain S6 could produce enterotoxins A and B in inoculated on cooked soy-beans. Its growth and enterotoxin production were not influenced by inoculation rate nor by the presence of actively growing Rhizopus oligosporus, the fungus responsible for temph formation. Enterotoxin levels were highest after 48 hr fermentation. Presence of lactobacilli (L. brevis or L. plantarum) during the temph fermentation did not influence staphylococcal growth, but enterotoxin levels were reduced. Reduced oxygen pressure did not affect staphylococcal growth, but resulted in lower enterotoxin levels after 48 h incubation. The thermal stability of enterotoxin A in temph was significantly lower than in Brain Heart Infusion broth of comparable pH. Heating of enterotoxin containing tempe with mash reduced enterotoxin A by 99.7% as measured ELISA and animal feeding methods. AS

1921 Vaidya (PS), Patil (MN) and Adinarayanaiah (CL). Aflatoxin (B_1) content of soybean and sunflower seeds. Oils and Oilseeds Journal 41(7-9); 1989; 87-89

20 soybean and 76 sunflower seeds collected from Madhya Pradesh, Tamil Nadu and Karnataka States (India) were analysed for aflatoxin content. 4 soybean samples contained 25-120 p.p.b. and 5 sunflower seeds contained 60 to 750 p.p.b. of aflatoxin. The % of infected seeds in sunflower was 7.4 and in soybean 17. Suggestion has been made to fix aflatoxin limits to sunflower also under the Indian Food Laws. KAR

Soy proteins

1922 Sathe (SK), Mason (AC) and Weaver (CM). Thermal aggregation of soybean (Glycine max L.) sulphur-rich protein. Journal of Food Science 54(2); 1989; 319-323

The sulphur-rice protein (SRP) in soybeans aggregated at greater than or equal to 70 C due to thermal denaturation of the protein and subsequent formation of soluble and insoluble aggregates. Aggregation was dependent on heating temp., time, buffer comp., and the presence or absence of protein modifying agents in the heating buffer. Hydrophobic interactions and disulphide bonds helped stabilize the protein against thermal aggregation while hydrogen bonds and sulphydryl exchange promoted it. At pH 7.6, 4.5 mg protein/mL, 70 C and 1.0M salt concn., the rate of thermal aggregation was dependent on the anion type and followed lyotropic series SCN$^-$ I^{-1} > Br^{-1} > Cl.

AS

Sunflowers

Sunflower proteins

1923 Claughtor (SM) and Pearce (RJ). Preparation and properties of acid-modified sunflower protein isolate. Journal of Food Science 54(2); 1989; 357-361

Sunflower protein isolate (SFPI) 1-10% w/v dispersion, was heated in HCl (0.025-0.1M) at 90 C. Extents of deamidation and peptide bond hydrolysis were a function of both acid and protein concn. SDS gel electrophoresis indicated that acid modification of SFPI induced cleavage of a major protein component of mol. wt. about 66,000 daltons into two smaller components. Acid modificatioon decreased the isoelectric point of the protein and resulted in a marked increase in solubility at near neutral pH values. Acid-modified SFPI, soluble at pH 7, was successfully incorporated into a model infant formula. Acid modification also improved foam expansion and foam stability properties of SFPI. AS

TUBERS AND VEGETABLES

Root vegetables

Turnips

1924 Narayana (CK) and Maini (SB). Methods of storage of turnips and its effect on quality of the pickle. Indian Food Packer 43(3); 1989; 10-17

Pickles prepared from 5 var. of turnips (`Local', `Pusa Chandrima', `Pusa Swarnima', `Pusa Sweti' and `Purple top white Globe') were stored in (i) cold store at 1-2 C, 90-95% RH (ii) in cool chamber at 10-17 C, 90-95% RH and (iii) after steeping in solution containing 5% common salt, 1.2% acetic acid and 0.1% sodium metabisulphite. Organoleptic evaluation of pickle prepared from turnips stored in cold store showed highest overall score. Steeping preservation was found to be a cheap alternative to the cool storage. Pickles prepared from dried roots were found not suitable as they were leathery in texture. KAR

Tubers

Potatoes

1925 Gamble (MH) and Rice (P). The effect of slice thickness on potato crisp yield and composition. Journal of Food Engineering 8(1); 1988; 31-46

Potato tubers of CV. Record UK were used to produce crisps (chips) of different slice thickness (40-70) thousandths of an inch;

1-1.75 mm approx. using an industrial slicer. The slices were examined to determine max. thickness variability of each slice and the range of values produced at each set thickness. Prepared crisps were analysed to determine the effect of slice thickness on the yield and comp. of crisps. A series of regression equations were produced relating slice thickness and total surface area of slices to yield, moisture content and oil content of product. Oil uptake drying frying was found to be related to the surface area of the potato slices. AS

1926 Lamberg (I). Studies of water transport phenomena during potato-drying. Journal of Food Process Engineering 10(4); 1989; 285-299

1927 Rama (MV) and Narasimham (P). Control of potato (Solanum tuberosum L. cv. kufri jyoti) sprouting by sodium naphthyl acetate during ambient storage. Journal of Food Science and Technology, India 26(2); 1989; 83-86

As sodium salt of alpha-Naphthalene acetic acid (sodium naphthyl acetate-SNA) was found to be as effective as methyl ester of alpha-naphthalene acetic acid (MENA) for the control of sprouting of potatoes during storage at ambient conditions (22-35 C, RH 50-80%), parameters affecting efficacy of SNA were worked out. To control sprouting, potatoes were dipped in 10 to 10,000 p.p.m. solutions of SNA for 1 to 30 min. The sprouting decreased with the increase in concn., but the increase in duration of treatment had no additional inhibitory effect. Sprouting was min. when tubers were treated on the third day of harvest. Addition of 1000 p.p.m. Benlate to the treatment solution reduced the spoilage. Several batches of potatoes were treated with the same lot of SNA solution without causing any decrease in its concn. or in the efficacey of the treatment, which makes its use more economical in controlling potato sprouting than MENA. AS

1928 Sapers (GM), Douglas (FWJR), Bilyk (A), Hsu (A-F), Dower (HW), Garzarella (L) and Kozempel (M). Enzymatic browning in Atlantic potatoes and related cultivars. Journal of Food Science 54(2); 1989; 362-365

The extent of enzymatic browning at cut surface of 'Atlantic' potato, its siblings and parents, and 'Russet Burbank' was investigated. Browning, measured by tristimulus colorimetry, was compared with cvs variation in polyphenol oxidase (PPO), PPO substrates, and ascorbic acid. 'Atlantic' potato was much less subject to browning at cut and peeled surfaces than 'Russet Burbank'. Browning in Atlantic potato could be almost eliminated by dipping in water. 'Belchip' and 'Chipbelle' (siblings) and 'Wauseon' and 'Lenape' (Parents) were similar to 'Atlantic' potato in browning behaviour. The tendency to brown in these cvs and 'Russet Burbank' was correlated with total phenolic compounds , tyrosine, and to a lesser extent, PPO activity. AS

1929 Yusheng (Z) and Poulsen (KP). Diffusion in potato drying. Journal of Food Engineering 7(4); 1988; 249-262

The potato drying exp. reported here describe only falling rate drying behaviour. The experimental results were analysed with the help of the standard solution to the non stationary state diffusion equation. The effects due to several variables on the diffusivity of water in potato drying were investigated and in order to extrapolate diffusivities for other drying conditions a semi-empirical equation was developed. NGKR

Sweet potatoes

Sweet potato starch

1930 Boki (K), Ohno (S) and Shinoda (S). Determination of sweet potato starch mixed in Kudzu starch by moisture sorption method. **Journal of Food Science** 54(2); 1989; 487-488

Moisture sorption isotherms of Kudzu starch, sweet potato starch, and their mixtures were measured at 20 C by a gravimetric method with a vacuum apparatus. Correlation was found between the mixture ratio of sweet potato starch to Kudzu and moisture content of the mixed starches at a water activity of 0.750 the correlation coeff. was 0.9955. The moisture sorption method could be used to determine the amount of sweet potato starch mixed as commercial Kudzu starch. AS

Vegetables

1931 Gould (MF) and Golledge (D). Ascorbic acid levels in conventionally cooked versus microwave oven cooked frozen vegetables. **Food Sciences and Nutrition** 42F(3); 1989; 145-152

Studies are undertaken to determine the ascorbic acid levels in conventionally cooked vegetables as compared to microwave oven cooked frozen vegetables and results presented in this paper. Six types of frozen vegetables were tested and the increase in vitamin delivery per 100 g as served after microwave cooking ranged between 28 and 51% where the control method followed was by boiling. In case of spinach where no water is added for normal cooking the difference was found to be in average slightly small. NGKR

1932 Strugnell (C). Increasing the shelf-life of prepacked vegetables. **Irish Journal of Food Science and Technology** 12(1/2); 1988; 81-84

A problem encountered in retailing prepared vegetable (Carrots, cabbage, broccoli, cauliflower, celery, leeks, parsley and turnip) products is a short shelf-life. This communication shows that by following a strict regime of chemical dips and treatments an acceptable shelf-life can be obtained. AS

1933 Tomar (MC), Singh (UB) and Bisht (NS). Dehydrated mixed vegetable pickle-a study on its preparation and storage. **Indian Food Packer** 43(3); 1989; 53-60

Dehydrated mixed vegetable pickle (carrot, cauliflower, turnip, and green peas) was prepared and packed in 300 guage polyethylene bag, heat sealed and stored at room temp. for 12 months. Wt. reduction on dehydration was 75% of the wt. of the ingredients used. The reconstituted pickle having 8.29% salt and 1.58% acidity conforms to the accepted standards of acceptability. Storing the product below 64.8% RH and a 32.9% moisture content is ideal for the retention of colour, flavour and a shelf-life of more than one yr. could be expected of the product. VKR

Cucumbers

1934 McFeeters (RF), Senter (MM) and Fleming (HP). Softening effects of monovalent cations in acidified cucumber mesocarp tissue. Journal of Food Science 54(2); 1989; 366-370

Due to the importance of salt as an ingredient in cucumber pickle products, the effect of salt concn. on first-order softening rates during acid storage was determined. Softening rates of unfermented tissue increased as the NaCl increased from 0 to 1.5M, whether or not the tissue was blanched. For unheated, fermented tissue, softening rates increased between 0 and 0.2M NaCl but did not increase above 0.2M NaCl. Changes in the degree of pectin methylation were not highly correlated with changes in softening rates. The ions Li^+, K^+, Rb^+, and Cs^+ had softening effects similar to Na^+. An enthalpy of activation of 145 kJ/mole was determined for softening of blanched tissue stored in 1.5M NaCl. This is the first demonstration of a softening effect by monovalent cations in cucumber tissue. AS

Cucumber pickles

1935 Rodrigo (M) and Alvarruiz (A). The influence of fermentation and pasteurization on the texture of cucumber pickles. Journal of Food Engineering 7(2); 1988; 113-125

This paper reports on the establishment of optimum conditions for pasteurisation for both unfermented and fermented cucumbers and the selection of an instrumental method for assessment and detn. of cucumber texture in the above products. From the studies it was seen that the max. penetration force in whole cucumbers was selected as the most useful method as it correlated well with sensory evaluation and its moderate variability. The optimum processing conditions found for pasteurisation of unfermented cucumbers are high temp. and short times whereas for fermented cucumbers a process temp. of 70 C was found to be optimum. NGKR

Leafy vegetables

1936 Kaushalya Gupta Barat (GK), Wagle (DS), Chawla (HKL). Nutrient contents and antinutritional factors in conventional and non-conventional leafy vegetables. Food Chemistry 31(2); 1989; 105-116

Tender green leaves of conventional and non-conventional vegetables were evaluated for nutritional factors, which depict their quality. Crude protein, ether extractives and ash varied from 15.7 to 28.5, 1.0 to 6.5 and 9.2 to 20.4% resp. Amaranthus flavus (amaranth).

Colocasia esculenta (colocasia), **Moringa oleifer** (drumstick), **Trigonella foenum graecum** (fenugreek), **Azadirachta indica** (Neem) and **Telfaria occidentalis** (Pumpkin) are good sources of neutral detergent fibre (NDF), and acid detergent fiber (ADF). These vegetables are found to be rich sources of macro and micro elements. Ca, P and Zn varied from 0.9 to 2.9, 0.4 to 1.2% and 17.5 to 46.2 p.p.m. resp. Drumstick contained the max. amount of flatus factors (sucrose + raffinose + stachyose) (5.6%) followed by neem (3.2%) and colocasia (2.2%). Amaranth had the max. amount of nitrate, oxalate, trypsin inhibitor and phytate. Variable amounts of amino acids were present in these vegetables. Protein was found to be positively correlated with NDF, Cu, Fe, Zn and Mn; and negatively correlated with ADF, NDF, phytate, phenol and saponin contents. Saponin was found to be positively correlated with sugar, Fe and Zn contents. Phytate is negatively correlated with saponin, Cu, Zn, NDF and ADF but positively correlated with phenol. AS

Amaranthus

1937 Bressani (R). The proteins of grain amaranth. **Food Reviews International** 5(1); 1989; 13-38

This review covers protein content in amaranth grain (protein distribution, content, relationship between protein content and cultural practices, amino acid content, protein content and their amino acid content in amaranth and nutritive value of the protein); and effects of processing on the nutritional quality of amaranth, (atm. pressure, drum cooking and drying, dry cooking, toasting, comparative analysis between processes, effect of germination, supplementary and complementary value of the proteins of amaranth grain, and protein concn. from amaranth grain). 76 references. BV

Asparagus

1938 Ganthavorn (C) and Powers (JR). Partial purification and characterization of **Asparagus** lipoxygenase. **Journal of Food Science** 54(2); 1989; 371-373

Lipoxygenase (LOX) from fresh **Asparagus** was partially purified by extraction of acetone-washed **Asparagus** powder with pH 4.5 potassium phosphate, ammonium sulphate fractionation and carboxymethylcellulose (CMC) chromatography. **Asparagus** LOX purified by ammonium sulphate fractionation had a pH activity optimum of 5.5-6.0 and was stable at pH 4.5-8.0 when stored at 2 C. **Asparagus** LOX was active on monolinolein as well as linoleic acid, but activity was very low on di- or tri-linolein. The CMC fractions with greatest LOX activity were nearly free of peroxidase activity while the protein fractions which did not bind with CMC at pH 5 were peroxidase active. The LOX activity in the purified **Asparagus** extract was 90% inhibited by 1 mM cyanide when preincubated for 30 min at 25 C. AS

Tomatoes

1939 Efiuvwevwere (BJO) and Hobson (GE). Quality changes in tomatoes and resistance to Alternaria infection as influenced by varying storage temperature. Journal of Food Science 54(2); 1989; 376-378

Tomato fruits were stored at 27 C continuously or at temp. of 35, 18 and 27 C for 3, 2, and 4 days, resp., before inoculation with **Alternaria solani.** Following inoculation, fruits were ripened at 27 C for 6 days and evaluated for quality changes and response to infection. Decreased resistance occurred in fruits stored at varying temp., resulting in significantly larger lesions. Surface colour was not significantly affected by storage and inoculation. Firmness was only significantly affected in noninoculated fruits. The pH and titratable acidity improved significantly in control fruits. Total soluble solids was only different in noninoculated fruits. Reducing sugars were lower in inoculated fruits. AS

Tomato pastes

1940 Kokini (JL) and Carrillo (AR). Effect of tomato paste on rheological properties and particle sine distribution of model oil-in-water emulsions. Journal of Food Science 54(2); 1989; 437-439

The role of tomato paste in stabilizing model o/w salad dressing formulations pre-stabilized with xanthan and propylene glycol alginate was studied at levels of tomato paste ranging from 3 to 12% using creep measurements, steady shear measurements and particle size measurements. The addition of tomato paste shifted the particle size distribution to lower values; this distribution was a function of aging time. Creep and steady shear measurements showed an increase in rheological parameters and an increas in viscosity, resp. suggesting that at higher or equal levels of 6% tomato paste the stability of the o/w emulsion was enchanced significantly. AS

FRUITS

1941 Casella (L), Gullotti (M), Marchesini (A) and Petrarulo (M). Rapid enzymatic method for vitamin C assay in fruits and vegetables using peroxidase. Journal of Food Science 54(2); 1989; 374-375

A new enzymatic method is reported for the assay of vitamin C in fruits and vegetables using peroxidase in the presence of hydrogen peroxide. The method is based on the colorimetric detection of the highly coloured products of oxidation of 1,4-diaminobenzene, added as synthetic substrate, that can be taken as the end-point for the oxidation of vitamin C. No interference by other biological compounds contained in the fruits and vegetables was found. The method is as accurate and rapid as the traditional method employing ascorbate oxidase but has the additional advantages of requiring a much cheaper enzyme and no expensive instruments. AS

1942 Exama (A) and Lacroix (C). Development of a high proteic value fruit paste. 1. Influence of some processing parameters. **Sciences des Aliments** 9(2); 1989; 285-305 (Fr).

A fruit paste has been obtained by cooking a mix of whey protein isolate, mango puree and sugar. The pH has been adjusted at 3.5 with 4M citric acid. This heating temp. has been maintained at 95 C. This temp. was selected from preliminary trials. The influence of heating time (15, 20 and 25 min.), protein concn. (4.5, 6.0, and 7.5%) and sugar content (20, 30 and 40%) has been studied in terms of water losses during cooking, colour of the final product, water activity and texture of the gel. Water losses during cooking have been relatively low (7% in the average). They varied inversely with sugar content; the colour of the product darkened with the heating time. However on the range of the heating times used, the colour of the samples was very attractive except for the 15 min. heating time, where the colour was too light; the water activity of the samples remained high for most of the samples (0.94 in the average) except for ones with high sugar concn. The textural parameters varied mainly with the heating time and protein content. Elasticity, cohesiveness and firmness increased with heating time and protein content. Adhesivity increased only with heating time, and sugar had a very limited effect on texture. AS

1943 Exama (A) and Lacroix (C). Development of a high proteic value fruit paste. 2. Storage stability. **Sciences des Aliments** 9(2); 1989; 307-317 (Fr).

Four high proteic fruit paste formulations selected from a previous study have been prepared from a whey protein isolate, a mango puree and sugar. The pH has been readjusted at 3.5 with 4 M citric acid. The cooking temp. in the center of the samples has been maintained at 95 C. The samples were wrapped in polypropylene packaging film. Sample analysis (moisture content, water activity, colour texture) and microbial stability have been carried out at 0, 7, 15 and 30 days storage at 25 C under various relative humidities (20, 57 and 93%). At 20% and 57% relative humidity, moisture content and water activity of the samples decrased while firmness values increased. At 93% relative humidity, moisture content and water activity increased slightly while firmness values decreased. For all relative humidities, the colour of the samples darkened with storage time, the limiting factor for storage has been mold growth, the shelf-life has been over 15 days for most of the samples. Water activity markedly influenced the development of molds. The sample with the highest water activity value was attaked before and more seriously than the others. AS

1944 Rekha Bhadauria.. Lipolytic microorganisms isolated from dry fruits. Science and Culture 55(5); 1989; 173-175

Ten fungi and two Bacilli frequently occurring in the kernel of Chironji (Buchanania lanzan Spreng) and walnut (**Juglans regia Linn.**) were isolated and except one all were capable of splitting fats by producing lipase. All the seven sp. of **Aspergillus** were lipolytic and

A. flavus I was strongly lipolytic capable of changing the colour of the medium. Lipase activity of fungi and bacteria was also tested on healthy and deteriorated oils of Chironji and walnut with the addition of nile-blue sulphate and CaCl separately incubated for 15 days at 28 plus or minus 2 C temp. All the seven **Aspergillus** sp. and **Penicillium janthinellum** showed lipolytic activity in the above oils, whereas **Rhizopus nigricans** in healthy Chironji oil and **Chaetomium globosum** in all the oils did not show lipolytic activity. Cocci and Bacilli showed lipolytic activity only in CaCl added healthy and deteriorated oils of Chironji and walnut. KAR

1945 Tomas Lorente (F) and Ferreres (F). Flavonoid sulphates from **Phoenix dactylifera** fruits. **Revista de Agroquimica y Tecnologia de Alimentos** 28(4); 1988; 581-585 (Es).

In the fruits of Phoenix dactylifera L. (Palmae), five flavonoid sulphates have been identified for the first time. The sulphate residues are linked to the sugar moiety of the flavonoid glycosides. Two of them, luteolin and chrysoeriol 7-glucoside sulphates are known compounds. The other three, quercetin 3-glucoside sulphate, luteolin 7-glucoside disulphate and chrysoeriol 7-glucoside disulphate, are new naturally occurring compounds. The flavonoid sulphates are present as the Na salts. In addition, the non-sulphated flavonoids, chrysoeriol 7-glucoside, luteolin 7-rutinoside, chrysoeriol 7-rutinoside, quercetin 3-glucoside, isorhamnetin 3-glucoside and isorhamnetin 3-rutinoside have been detected. AS

Apples

1946 D'Souza (MC) and Ingle (M). Effect of delayed cooling on the post storage flesh firmness of apples. Journal of Food Science 54(2); 1989; 493-494

Decreasing the delay in proper cooling of apples before storage can decrease the softening of fruit in storage. Three apple cvs were studied and storage delays were simulated for two growing seasons. Each cv showed a different softening rate in storage as a result of delays in cooling. Apple cvs should be cooled rapidly especially those susceptible to firmness loss as a result of delays in cooling. AS

1947 Lin (TY), Koehler (PE) and Shewfelt (RL). Stability of anthocyanins in the skin of Starkrimson apples stored unpackaged, under heat shrinkable wrap and in-package modified atmosphere. Journal of Food Science 54(2); 1989; 405-407

The concn. of cyanidin-3-galactoside, cyanidin -3-arabinoside, and an unidentified cyanidin arabinoside in the skin of Starkrimson apples stored unpackaged, under in-package modified atm. and in heat shrinkable wrap were determined at, 7, 23, and 30 wks storage. Carbon dioxide levels of higher than 73% in in-packaged modified atm. severly destabilized the three anthocyanins. The unidentified cyanidin arabinoside was the most stable anthocyanin in the skin of Starkrimson apples. Cyanidin-3-galactoside was more stable in the skin of unpackaged apples than shrink-wrapped apples. AS

1948 Roudot (A-C), Grotte-Nicolas (M), Duprat (F) and Arakelian (J). Relationship between susceptibility to mechanical injury and flesh firmness during cold storage for two varieties of apples. Sciences des Aliments 9(2); 1989; 319-333 (Fr).

The susceptibility of the var. of apples 'Golden Delicious' and 'Starkrimson', to mechanical injury was characterized by means of three elastic indices. Changes in these indices were studied over a 14 wks cold storage period. Comparisons were made between elastic indices and two flesh firmness measurements, obtained by penetrometry. The theory of elasticity gave a close approx. and made it possible to calculate the limit strength of fruit flesh under external stress. Elastic indices were evaluated from two simple measurements impact area diameter and bruise depth. Comparisons between penetrometric data and elastic indices showed that the susceptibility of apples to mechanical injury could not be assessed by firmness measurements alone. AS

Bananas

1949 Shantha Krishnamurthy. Storage life and quality of Robusta banana in relation to their stage of maturity and storage temperature. Journal of Food Science and Technology, India 26(2); 1989; 87-89

Green unripe, 'Robusta' banana at two stages of maturity could be held at 15 C and 20 C for one to four wks, followed by proper ripening at ambient conditions. Fruits remained green, firm and unripe for two to three wks at these temp. The delay in ripening was correlated with reduced rates of softening, peel colour development, increased pulp peel ratio, tannins, total sugars and alcohol insoluble residue in the pulp of the fruit. Wt. loss was less in fruits held at 15 C and 20 C. Quality of the fruit after one to four wks of holding at 20 C was the best followed by fruits held for three wks at 15 C. By harvesting the fruits early at II stage of maturity, shelf-life could be extended from 16 to 21 days at ambient storage. AS

Blueberries

1950 Proctor (A) and Peng (LC). Pectin transitions during blueberry fruit development and ripening. Journal of Food Science 54(2); 1989; 385-387

Quantitative and qualitative changes in the pectin comp. of "Bluetta" blueberries were determined during fruit development between 30 and 57 days after full bloom. The contribution of alcohol insoluble solids (AIS) to the total fruit mass decreased threefold with maturation, while the pectin contribution decreased twofold in the fruits. Within the AIS fractions during ripening there was a reduction in dilute alkali soluble pectin (DASP) from about 65% to 20% of the AIS. A corresponding increase was observed in water soluble pectin (WSP), from about 20% to 60%, while chelator soluble pectin (CSP) increased slightly. AS

Cranberries

1951 Andersen (OM). Anthocyanins in fruits of **Vaccinium oxycoccus** L. (small cranberry). **Journal of Food Science** 54(2); 1989; 383-384

Peonidin-3-glucoside (41.9%) and cyanidin-3-glucoside (38.3%) were the main anthocyanins isolated from fruits of **Vaccinium oxycoccus** L. (small cranberry). Smaller amounts of the 3-monogalactosides and 3-monoarabinosides of peonidin and cyanidin were found in addition to the 3-monoglucosides of delphinidin, petunidin and malidin. The total anthocyanin content in the fruit averaged 78 mg/100g fresh fruit. This anthocyanin pattern is different from that of the American cranberry (**Vaccinium macrocarpon** L.). AS

Dates

1952 Sachde (AG), Al-Bakir (AY) and Abdul-Raheem (JAK). Polyphenol oxidase from Barhee and Zahdi dates. II. Characterization. **Journal of Food Biochemistry** 12(4); 1989; 241-251

Purified polyphenol oxidase (PPO) from Barhee and Zahdi date cvs had a mol. wt. of 17,500 and 17,000, resp., as determined by exclusion gel chromatography. The enzyme possessed activity on o-diphenols but not on monophenols or m-diphenols. The highest activity was on catechol with K_m of 3.5 and 8,75 mM for PPO from Barhee and Zahdi dates, resp. PPO from the two cvs showed optimal pH for activity and stability around 6.0 and 7.0 resp. The enzyme was completely inactivated when incubated at 70 C for 10 min. Activation energy for conversion of substrate to product was 3400 and 3600 Cal/mole for PPO from Barhee and Zahdi dates resp. However, the activation energy for denaturation was 28000 and 27000 cal/mole for the enzyme from Barhee and Zahdi cvs. resp. Ascorbic acid, oxalic acid and sodium metabisulphite caused non-competitive inhibition for PPO activity, while sodium chloride was an uncompetitive inhibitor. Sodium metabisulphite was the most potent inhibitor with K values of 0.025 and 0.030 mM for PPO from Barhee and Zahdi dates, resp. AS

1953 Sachde (AG), Al-Bakir (AY) and Abdul-Raheem (JAK). Polyphenol oxidase from Barhee and Zahdi dates. I. **Journal of Food Biochemistry** 12(4); 1989; 227-240

Barhee and Zahdi dates (**Phoenix dactylifera**) contain polyphenol oxidase (PPO) at all maturity stages. The highest PPO activity is present in the medium green and late yellow stages of Barhee and Zahdi dates, resp. The extracts of medium green stage of Barhee dates contained proteolytic activity. Four PPO forms were purified to homogeneity by acetone precipitation and DEAE-cellulose chromatography. The total fold purification was 8.0, 10.0, 12.5, and 15.0 with 6.7, 0.7, 2.2, and 2.7% recovery of PPO activity. A single PPO form was observed when 1.0 mM of phenylmethylsulphonyl chloride (PMSC) was used in extraction solutions. However, only a single PPO form was observed in Zahdi dates and purified 13.1 fold with 7.7% recovery of activity. AS

Grapefruits

1954 Kawamura (Y), Uchiyama (S) and Saito (Y). A half-embryo test for identification of gamma-irradiated grape fruit. Journal of Food Science 54(2); 1989; 379-382

Whole grapefruit were exposed to 5, 15, 30, 50, and 100 Krad doses of gamma-radiation. Seeds were removed and half-embryos, consisting of one cotyledon and embryo axis, dissected from the surrounding tissue. Non-irradiated half-embryos germinated faster than intact or partially dissected (outer seed coat removed) seeds. Shoot elongation was also quicker, occurring within 6 days. Irradiated half-embryos over 15 Krad doses showed markedly reduced root growth and shoot elongation was almost totally retarded. Differences between irradiated and nonirradiated half-embryo were not affected when var., harvest date, and fruit storage conditions were varied. This test could thus discriminate between irradiated and non-irradiated grapefruit. AS

Grapes

1955 Saravacos (GD), Marousis (SN) and Raouzeos (GS). Effect of ethyl oleate on the rate of air-drying of foods. Journal of Food Engineering 7(4); 1988; 263-270

The effect of ethyl oleate on the rates of drying of model foods and a waxy fruit (grapes) and to know the mechanism of interphase mass transfer during air drying of foods was investigated and results were presented in this paper. It was found that by dipping grapes in alkali emulsions of ethyl oleate the drying rate was increased throughout the drying period. This has been attributed to solvent action of ethyl oleate on the skin wax and the grape cell walls. NGKR

Kiwifruits

1956 Venning (JA), Burns (DJW), Hoskin (KM), Nguyen (T) and Stee (MGH). Factors influencing the stability of frozen kiwifruit pulp. Journal of Food Science 54(2); 1989; 396-400

The biochemical, sensory, and quality changes that occur during processing and prolonged frozen storage of kiwifruit pulp were studied. The temp. and processing time during pulp manufacture and freezing are critical factors in determining the % total chlorophyll and colour of the frozen pulp. Storage of pulp at acceptable commercial frozen storage temp. (-18 C or below) fo- 12 months resulted in a stable colour, and a slight decrease in the % total chlorophylls and ascorbic acid. The type of packaging material used and deaeration of pulp did not influence the above findings. The sensory qualities of the pulp were not affected by the storage conditions. AS

Mangoes

1957 Chau (HTN), Pal (RK) and Susanta KRoy). Studies on extraction of pulp and development of beverages from green mangoes. Indian Food Packer

43(3); 1989; 27-34

Green mangoes having fully developed stones were either boiled in water for 20 min to completely soften the pulp and squeezed by hand and sieved through a mesh or baked in a muffle furnace at temp. of 200, 300, 400 and 500 C for 25, 20, 10 and 10 min, resp. Pulp yield was highest (43.9 and 43.40 at 200 and 300 C) and retention of ascorbic acid was highest (60.43 mg/100 g) in mangoes baked at 200 C for 25 min. or at 300 C for 20 min. Squash and nectar prepared from the baked pulp was organoleptically acceptable. At higher temp. burnt smell was perceptible in the beverages. KAR

1958 Eswara Reddy (S). Note on mineral composition of mango (**Mangifera indica** L.) seed kernels. **Andhra Agricultural Journal** 35(1-2); 1988; 159-160

Mango kernels collected from four var. (Bangalora, Cherukurasm, Himayuddin and Neelum) were analysed for N, P, K, Na, Ca, Mg and S and the range and mean values are given. Neelum var. contained (%) N, 2.03, P, 0.198, K, 0.664, Na, 0.041, Ca, 2.88, Mg 0.485 and S 0.352 which is highest for the 4 var. KAR

1959 Selvaraj (Y). Studies on enzymes involved in the biogenesis of lipid derived volatiles in ripening mango (**Mangifera indica** L.) fruit. **Journal of Food Biochemistry** 12(4); 1989; 289-299

Activity of enzymes involved in the biogenesis of lipid-derived volatiles was assayed in five mango cvs. during ripening. Lipase activity was max. either at harvest maturity and/or at 1/2 ripe stage depending on the cv. and declined in later ripening stages. Cvs. Banganapalli, Langra and Totapuri had high relative lipase activity. Lipoxygenase activity increased from harvest maturity until 1/2 ripe stage and then declined. The relative activity was max. in cvs. Langra and Dasheri. Alcohol dehydrogenase activity increased from harvest maturity to either 1/2 ripe stage and/or 3/4 ripe stage depending on the cv. and the declined. The aldehyde-forming activity was high at harvest maturity, decreased a little in 1/2 ripe stage and thereafter declined rapidly. The cv. Alphonso had higher relative aldehyde forming activity during ripening. AS

Oranges

1960 Sala (JM), Mallent (D), Perez-Zuniga (F) and Cunat (P). Colour changes of oranges and mandarines in the degreening process with ethylene. **Revista de Agroquimica y Tecnologia de Alimentos** 28(4); 1988; 558-566 (Es).

The changes in colour (Hunter a/b ratio) of oranges, cv, "Navelina", and mandarines, cv "Oroval", during the degreening process with ethylene were studied. From the results obtained equations have been derived that allow for the detn. of the colour at harvest and the intensity of the degreening process that are needed to get a preselected final colour. AS

Peaches

1961 Delwiche (MJ). Maturity standards for processing clingstone peaches. Journal of Food Process Engineering 10(4); 1989; 269-284

The flesh colour of 5 clingstone peach cvs was measured (in CIELAB coordinates) by tristimulus colorimeter before and after canning. Before canning, fruit were separated into 3 colour classes (1A: green-yellow, 4A: yellow-green, 7A: orange) by visual comparison with a trial maturity chart. After canning flesh colour was measured and visually graded. All samples in colour class 1A were rated USDA grade C, while classes 4A and 7A were rated grade A. Flesh colour was also measured as a function of time before and after harvest. Fresh flesh L* values were approx. constant, a* values increased steadily, and b* values increased then slightly decreased. Final specifications for a new maturity chart were 7 colours of constant luminance (L* = 76.5) and linearly increasing a* and b* values (-5.0 to 13.0 and 70.1 to 76.4 resp.), corresponding to a time step of 3.5 days between colours. AS

1962 Wafa (FY) and Rao (VNM). Some physicochemical and sensory characteristics of peach nectar stored in various packaging materials under ambient conditions. Journal of Food Science 54(2); 1989; 401-404

The effectiveness of pouches, including plastic and aluminium foil laminations, in preserving the physiochemical and sensory characteristics of peach nectar compared to the more traditional packages (can and glass jar) was determined. Three sucrose syrup to peach puree ratios (50:100, 60:100, 70:100) were tested and based on the results obtained from a sensory panel, the final study was performed using a ratio of 60:100. The sensory, colour, viscosity, and chemical data showed that pouches made from aluminium foil laminations were as good in retaining the quality of the peacn nectar as the jar and the can. Significant correlations were found between several instrumental and sensory parameters used in determining the quality of peach nectar. AS

Strawberries

1963 Hong (YC), Read (PE), Harlander (SK) and Labuza (TP). Development of a tissue culture system from immature strawberry fruits. Journal of Food Science 54(2); 1989; 388-392

The potential for production of strawberry flavour from cells grown in plant tissue culture was investigated. Immature strawberry fruits from strawberry cvs (Fragaria x ananassa Brighton, Earliglow, and Aptos) were cultured on modified Murashige and Skoog (MS) basal medium supplemented with kinetin and 2,4-dichlorophenoxyacetic acid. Parameters that influence callus formation and growth rate including medium,.comp., phytohormone concn. and photoperiod were studied. Cvs varied in their ability to initiate callus formation and of the three types identified, only the friable type II callus position, types and levels of phytohormones, and inoculum size influenced cells growth in liquid suspension culture. AS

CONFECTIONERY, STARCH AND SUGAR

Confectionery

Chocolates

1964 Evenson (ML), Ward Hinds (M), Bernstein (RS) and Bergdoll (MS). Estimation of human dose of staphylococcal enterotoxin A from a large outbreak of staphylococcal food poisoning involving chocolate milk. International Journal of Food Microbiology 7(4); 1988; 311-316

An outbreak of gastroenteritis in a school district in the United States was determined to be staphylococcal food poisoning due to 2% chocolate milk containing staphylococcal enterotoxin A (SEA). Twelve one-half pint (approx. 0.28 l) cartons of the 2% chocolate milk from this outbreak were analyzed for the quantity of SEA present in the milk. The amount of SEA in the cartons varied from 94 to 184 ng with the average being 144 ng (mean = 139 plus or minus 45). The attack rate for vomiting among those who consumed more than one carton was greater (38.3%) than among those who consumed only one carton (31.5%) with the highest attack rate among those who consumed three or more cartons (44.4%). AS

Honey

1965 Mandal (S). Melissopalynological study of the honey samples of Murshidabad district, West Bengal. Science and Culture 55(5); 1989; 178-181

Pollen analysis of the honey collected from two places in Murshidabad district, West Bengal (India) was done. In total 19 pollen types have been recorded which include Pollen from Brassica integrifolia, Azadirachta indica, Bombox ceiba, Oryza sativa, Carica papaya, Cocos nucifera, Mangifera indica, and Coriandrum sp., highest pollen was in honey of A. indica from Berhampore and honey of Br. integrifolia and Kandi. The pollen morphotypes recovered were mostly entomophilus. A pollen census of the collected honey samples shows the following types (primarily according to NPC classification): 1-porate, 1-sulcate, pantoporate, 3-porate, 3-colpate, and 3-colporate with a number of varied exine patterns. The shape of the recorded pollen types was variable like prolate, prolate-spheroidal, oblate-spheroidal and oblate, etc. KAR

Starch

1966 Schweizer (TF), Reimann (S) and Wursch (P). Definition and measurement of a starch digestion index and a study of factors determining starch digestion rates in foods. Lebensmittel-Wissenschaft und-Technologie 21(6); 1988; 352-357

An improved method for measuring in vitro starch digestion rates was designed. Foods were incubated with pepsin and HCl and then digested with an enzyme mixture of pancreatin and trypsin. Reducing sugars measured as maltose equivalents after one hr digestion were expressed in the form of a digestion index (DI). Raw wheat starch and cooked rice starch were used as reference compounds to define the DI-scale. The method was applied to a range of 26 common foods including cereals, legumes and potatoes. Several factors determining starch digestion rates were examined, in particular cooking procedures and blending of foods before and after cooking. The relationship between DI and the glycemic index (GI) is discussed and it is suggested that improved correlations between the two indices would result if the GI was also defined on a scale with two reference compounds. AS

BAKERY PRODUCTS

1967 Neeta Joshi, Godbole (SH), Pradnya Kanekar . Microbial and biochemical changes during Dhokla fermentation with special reference to flavour compounds. **Journal of Food Science and Technology, India** 26(2); 1989; 113-115

Microbial and biochemical changes occurring during Dhokla fermentation were studied to find out optimum concn. of microbial metabolities that impart typical aroma, flavour and texture to the product. During the course of fermentation from zero to 18 hr, population of **Lactobacillus fermentum**, **Leuconostoc mesenteroides** and a yeast, **Hansenula silvicola** rose from 6 x 10^6 /g, 3 x 10^4 /g and 7 x 10^6 /g to 35 x 10^6 /g, 24 x 10^6 /g and 27 x 10^6 /g resp.; pH dropped down from 5.3 to 4.0; total titrable acidity increased from 0.33 g/L to 1.2 g/L; total volatile fatty acids (VFA) comprising acetic, propionic, isobutyric and iso-valeric acids increased from 54.8 to 582.8 mg/L; acetoin content rose gradually from 0.7 to 7.2 μg//g and vol. of the batter increased from zero to 95.6%. At 16th hr of fermentation, the product exhibited the best sensory qualities which could be attributed to 0.95 g/L total titrable acidity, 8.6 μg//g acetoin, 479 mg/L total VFA and 84.8% rise in vol. of the batter. AS

Bread

1968 Benedito de Barber (C), Prieto (JA) and Collar (C). Chemical changes during bread dough fermentation. X. Modifications of acetic acid soluble nitrogenous compounds during mixing fermentation and baking. **Revista de Agroquimica y Tecnologia de Alimentos** 28(4); 1988; 529-538 (Es).

The trend, extent and rate of chemical changes undergone by 0.01N acetic acid soluble N compounds, from wheat flour (WF), unfermented bread dough (UBD), 2.5-($F_{2.5}$), 6- (F_6), 12- (F_{12}) and 24- (F_{24})h fermented bread doughs, and bread (B) have been investigated during mixing, fermentation and baking. Amino acid (AA), low mol. wt. peptide (LMWP) and polypeptide (MW < 14,000 daltons) (PP) contents in the extracts increased during mixing (WF - UBD); while protein content (P) decreased, especially for alpha-, beta- and -gamma- gliadins (MW: 30,000 -41,000 daltons). During fermentation, AA and LMWP decreased at the beginning ($F_{2.5}$, F_6) and increased later (F_{12}, F_{24}); PP showed the opposite trend. As expected, extractability of nitrogenous compounds decreased markedly during baking (F 2.5 - B). AS

1969 Martinez-Anaya (MA), Torner (MJ), Urquidi (ME), Ejarque (J) and Benedito de Barber (C). Microflora of the sour dough of wheat flour bread. VIII. Effect of preservation techniques and storage time on functional properties, in sugar solution, of microbial mass from **Lactobacillus brevis. Revista de Agroquimica y Tecnologia de Alimentos** 28(4); 1988; 490-500 (Es).

The effects of several preservation procedures-freeze-drying and freezing, using different temp. and protective agents of microbial mass (mm) of **Lactobacillus brevis** from wheat doughs, on viability and functional properties in sugar solution, -pH, total titratable acidity and gassing power-have been investigated. Freeze-dried mm gave low viability and dormancy. Freezing the mm in liquid N resulted in high survival percentages (78-104%) and no change in fermentative ability, with all the protective media used. The mms frozen at -196 C were stored at -30 C, 20 days. During this period, the viability of mms did not vary, but functional properties underwent variable changes, depending on the suspending protective medium, before freezing. Frozen mm containing 0.067M glutamic acid suffered important losses in its acid forming ability -42% for pH and 55% for total acidity-, whereas those with 10% skim milk maintained their fermentative activity unchanged. AS

Cakes

1970 Chang (SY), Toledo (RT) and Lillard (HS). Filtrate flow through filter cakes which exhibit time dependent resistance. **Journal of Food Processing and Preservation** 12(4); 1989; 253-269

Filtrate flow through filter cakes which exhibits time dependent resistance was studied by measuring filtration rates through four types of perlite filter aids using a lab. test system. Poultry chiller overflow water which has the potential for significant savings if recycled was used as the test suspension. Assumption of constant specific cake resistance and detn. of its value from a plot of filtration rate against cummulative filtrate vol. resulted in negative values for the medium resistance and large deviation between predicted and experimental values of filtrate vol. particularly in the early stages of the filtration cycle. Equations were derived for independent detn. of filtration medium resistance, which enabled detn. of time dependent cake resistance factor. An equation which considered a time dependent cake resistance predicted values for filtrate vol. which agreed well with experimental data. Data show that batch filtration of chiller overflow water will require very short cycle times for optimum filtrate flow. AS

Cookies

1971 Claughton (SM) and Pearce (RJ). Protein enrichement of sugar-snap cookies with sunflower protein isolate. Journal of Food Science 54(2); 1989; 354-356

Sugar-snap cookies were protein enriched with sunflower protein isolated (SFPI) at levels of up to 20% (flour wt. basis). Spread and surface grain were reduced, and colour was slightly affected, with increasing levels of SFPI. The addition of soy lecithin (1-2%) improved spread and surface grain characteristics. Sensory evaluation scores for cookies showed acceptable cookie quality at levels of up to 15% SFPI. AS

1972 Singh (N), Kaur (A), Pal Singh (R) and Sekhon (KS). Rheological and cookie making studies on wheat-rice flour blends. Journal of Food Science and Technology, India 26(2); 1989; 90-94

Effects of blending wheat flour with broken rice flours (raw rice, pressure parboiled and traditionally parboiled rice) on the farinographic and cookie making characteristics were studied. The farinographic water absorption and dough development time increased with the replacement of wheat flour with those of rice flours particularly with parboiled rice flours. On the other hand, dough stability decreased and the mixing tolerance index increased both pointing to the weakening of the dough. Overall, better cookies were produced by replacing 10% wheat flour with that of raw rice flour. Cookies were equally acceptable even upto 30% level. AS

Pasta

1973 Andrieu (J), Gonnet (E) and Laurent (M). Thermal conductivity and diffusivity of extruded durum wheat pasta. Lebensmittel-Wissenschaft und-Technologie 22(1); 1989; 6-10

Extruded durum wheat pasta thermophysical properties (heat capacity, thermal conductivity and diffusivity) were measured by two transient methods in the drying range of this foodstuff. Thermal diffusivity decreases with the temp. and pasta humidity; experimental results were correlated by an empiric relationship $a = f(x_e \quad , /T)$ with a mean error of 2%. Thermal conductivity increase slowly with pasta humidity and is almost temp. independent. The interpretation of these data by different conduction models shows that series model leads to the most consistent dry matter intrinsic conductivity value i.e. $\text{Lambda}_s = 0.31$ W/m K. AS

Tortillas

1974 Gomez (MH), McDonough (CM), Rooney (LW) and Waniska (RD). Changes in corn and sorghum during nixtamalization and tortilla baking. Journal of Food Science 54(2); 1989; 330-336

Structural changes occurred in corn and sorghum during the alkaline cooking process as it progressed from the raw kernel to the tortilla. The alkali weakened the cell walls, facilitating the removal of the pericarp, solubilized cell walls in the peripheral endosperm, caused swelling and partial destruction of starch granules, and modified the physical appearance of the protein bodies. Masa (ground nixtamal) consisted of small pieces of germ, pericarp, aleurone and endosperm, and free starch granules, cell fragments, and dissolved or dispersed solids and lipids in water. During tortilla baking, an additional degradation of cell walls. Further loss of starch crystallinity, and partial destruction of protein bodies occurred. AS

MILK AND DAIRY PRODUCTS

1975 Aneja (RP). Meeting the demand for milk and milk products in the 1990s. Indian Dairyman 41(6); 1989; 299-303

The author has surveyed the milk position in India during the course of the yr. strongly advocates for creating a national buffer stock and also advocates for a better milk transport system. The dairy based traditional foods, says the author must be initiated in small rural dairies. KAR

1976 Chothani (AA). Balancing milk supply and demand in Eastern Region. Indian Dairyman 41(6); 1989; 305-308

The author compares the milk price prevalent in the four regions of India during a specific month. He advocates for creating co-operative infrastructure at the production centres and improve the packaging, and shelf-life of milk. In metropolis, the author indicates that priority should be given for marketing strategies. KAR

1977 Choudhary (AK). Research needs for developing dairy industry. Indian Dairyman 41(1); 1989; 17-20

The author reviews the research needs of the Indian dairy industry in milk production and processing and packaging of milk and milk products. Different aspects covered include milk handling losses, price structure, dairy equipment for small scale milk processing, indigenous milk product development, enzyme in dairy industry, packaging, and effluent disposal. KAR

1978 Ghodeker (DR). Rapid tests for microbiological quality assurance. Indian Dairyman 41(1); 1989; 37-42

The need and the criteria for rapid microbiological tests for milk and its products have been briefly described. The usefulness of TDNase test and the rapid coliform test have been indicated along with the cost per sample. KAR

1979 Singhal (OP) and Des Raj. New approaches for chemical quality assurance. Indian Dairyman 41(1); 1989; 43-47

The raw materials used in dairy for which quality assurance is needed are listed. Among these detection of adulteration of milk with water by freezing point, instrumental methods available for milk analysis, estimation of total proteins in milk by formal filtration method and the effect of adulteration of solids-not-fat and proteins of cow and buffalo milk are the aspects covered. A Price Scale for the grading and pricing of milk has been evolved which is graphically presented. Lastly, small note on inspection of finished product has been given. KAR

1980 Verma (RD). Some aspects of energy conservation in dairy processing. Indian Dairyman 41(7); 1989; 389-391

The author briefly reviews the important aspect of energy conservation in dairy industry by first describing the generation and distribution of heat energy followed by the saving in energy that could be effected in heat and condensate recovery, regeneration in heat exchangers and minimising use of energy by selecting appropriate process. KAR

Milk

1981 Abichandani (H), Dodega (AK) and Sarma (SC). Applications of thin film scraped surface heat exchangers. **Indian Dairyman** 41(1); 1989; 21-24

The working of the thin film scraped surface heat exchangers has been described and its applications in (i) continuous ghee making including the technical data of pilot plant, (ii) continuous khoa making, (iii) ultra high temp. sterilization of milk and (iv) lactose manufacture from whey have been indicated. KAR

1982 Bhatia (US). Balancing milk supply and demand-some policy issues. **Indian Dairyman** 41(6); 1989; 318-320

In the Northern region of India the population is 28.3% and produces 44.5% of the milk in the country, the Central and Eastern region with 33.7% of the population produces 21.4% of the milk. The per capital availability of milk in rural/urban areas, and also in the 4 regions are mentioned. Suggestions have been listed for effecting a balanced supply of milk in rural/urban areas and also in the four regions of the country. KAR

1983 Faber (JM), Sanders (GW), Speins (JI), D'Aoust (J-Y), Emmons (DB) and McKellar (R). Thermal resistance of **Listeria monocytogenes** in inoculated and naturally contaminated raw milk. **International Journal of Food Microbiology** 7(4); 1988; 277-286

Raw whole milk inoculated with 10^5 CFU/ml of **Listeria monocytogenes** was thermally processed at 60-72. C for a min. holding time of 16.2 S with survival being observed at temp. up to 67.5 C. In addition, milk naturally contaminated with **L. monocytogenes** serotype I (around 10^4 CFU/ml) was pooled for 2 to 2.5 days and then run through an HTST pasteurizer at temp. ranging from 60-78 C. Viable **L. monocytogenes** were detected in the temp. range of 60-66 C. No viable **Listeria** were detected after treatment at temp. of 69 C and above in any of five trials. Efficacy of pasteurization and widespread use of processing conditions well above the min. HTST guidelines ensure the absence of **Listeria** in pasteurized milk products. However, survival of **Listeria** at sub-pasteurization temp. (60-67.5 C) is of concern with regard to heat-treated or raw-milk cheese. AS

1984 Griffith (L), Sigvaldson (E) and Sporns (P). Determination of lactose and lactose hydrolysis in milk using Cerium (IV). Journal of Food Science 54(2); 1989; 419-422

Lactose and lactose hydrolysis in milk were determined using a novel method involving a measurement of the time for 0.39M Cerium (IV) [Ce(IV)] in 0.5M nitric acid to be reduced to Cerium (III) [Ce(III)] after an initial precipitation of milk protein and fat. The time for the absorbance at 445 nm to decrease to 0.4 could be directly correlated with standard curves to determine either the amount of lactose or the degree of lactose hydrolysis. This Ce(IV) oxidation method was rapid (15 min) and exhibited good agreement with infrared methods of determining lactose and enzymatic methods of determining percentage lactose hydrolysis. Recoveries of lactose found using the Ce(IV) oxidation method from a number of milk samples containing different amounts of fat were comparable to recoveries using the infrared method of lactose detn. AS

1985 Kang (GS). Procurement and milk marketing in Bihar. Indian Dairyman 41(6); 1989; 309-317

In Bihar the variation in milk production between lean and flush season is 80:20 in 1986-87. The reasons for such high variation which include non availability of feeds and fodder, ignorance of farmers about breeding have been described and suggestions to overcome have been indicated. The measures adopted currently to overcome the milk shortage in lean seasons have been delineated. KAR

1986 Keogh (MK), Quigley (T) and Connolly Phelan (JA). Anhydrous milk fat. Irish Journal of Food Science and Technology 12(1/2); 1988; 53-75

The ingredients used, the method of emulsion preparation and the degree of working by scraped-surface cooling together affected the characteristics of low-fat spreads. Among the ingredients evaluated two of the emulsifiers and one of the stabilisers were suitable for water-in-oil type spreads. High-speed stirring in the feed tank produced the most stable emulsion. The emulsion was processed in a single scraped-surface chilling unit. The worker unit was not used. To produce a high-moisture spread of the water-in-oil type, the emulsions required more intensive working at higher refrigerant temp. than margarine. Under or over working caused inversion of the emulsion. Within the range of treatments tested, the max. degree of working at the high refrigerant temp. resulted in the lowest number of large moisture droplets and the lowest rate of microbial growth at 4 C storage. Max. working at the low refrigerant temp. produced the hardest product. When softer fats than milk fat were used for processing, optimum results were obtained at lower rates of throughput. AS

1987 Khurana (AS), Kaur (J), Sihgh (A) and Sedha (RK). Production of heat stable proteinases by psychrotrophic bacteria in milk. Journal of Food Science and Technology, India 26(2); 1989; 72-75

Raw and pasteurized milks were found to have psychrotrophs in the range of 1.5 - 10 x 10^5 and 1-2 x 10^2 per ml and proteolytic psychrotrophs in the range of 0.15 - 2.5 x 10^5 and 7-12 per ml, resp. Proteolytic psychrotrophs were identified to belong to five genera viz., **Pseudomonas** (42.3%); **Micrococcus** (32.7%); **Staphylococcus** (15.6%); **Alcaligenes** (7.7%) and **Flavobacterium** (2%). Proteinase produced by **Pseudomonas** sp. (isolate PM) retained nearly 72% of its activity when heated to 75 C for 10 min. A medium containing 1% tryptone and 0.75% yeast extract, at pH 7.0 under shaking conditions with 2% inoculum was found to be optimum for proteinase production. However, malt extract and fermentable sugars (except glucose) did not support proteinase synthesis. AS

1988 Mannino (S) and Pagliarini (E). A rapid HPLC method for the determination of vitamin C in milk. **Lebensmittel-Wissenschaft und-Technologie** 21(6); 1988; 313-314

A rapid, highly sensitive, high-performance liquid chromatographic method has been developed for the detn. of ascorbic acid in milk. After ultracentrifugation, samples are directly injected in the chromatograph equipped with an electrochemical detector using sulphuric acid 1 mM as mobile phase. In the experimental conditions adopted the detection limit (2 S/N) is 0.1 p.p.m. and the relative standard deviation for five detn. at 2.2 mg/l of ascorbic acid is 3.5%. The method is easy to perform and is recommended for large scale routine analysis. AS

1989 Rhim (JW), Jones (VA) and Swartzel (KR). Kinetics study in the colour changes of skim milk. **Lebensmittel-Wissenschaft und-Technologie** 21(6); 1988; 334-338

Colour change kinetics of skim milk were studied over a wide range of temp. (100-150 C) and times (0.5-180 min) using tristimulus values. The Hunter L-value followed first-order kinetics, Hunter a- and b value followed zero-order kinetics, Chroma value followed second-order kinetics, and the Browning Index followed zero-order kinetics with activation energies of 114.8, 104.9, 110.3, 103.6, 123.5 kJ/mol. resp. AS

1990 Rhim (JW), Jones (VA) and Swartzel (KR). Initial whitening phenomenon of skim milk on heating. **Lebensmittel-Wissenschaft und-Technologie** 21(6; 1988; 339-341

The whitening phenomenon of heat treated skim milk was studied with regard to kinetics. The whitening period, the time to reach max. lightness from introduction of the milk sample to the oil bath, demonstrated an exponential relationship with heating temp. Activation energy of the whitening reaction was 67.92 KJ/mol, nearly identical to the activation energy for whey protein denaturation. This fact supports Burton's hypothesis that initial whitening is caused by the denaturation of heat-labile soluble proteins in milk. AS

1991 Russell Bishop (JR) and Juan (J-Y). Improved methods for quality assessment of raw milk. Journal of Food Protection 51(12); 1988; 955-957

Two hundred raw milk samples obtained from locations throughout Virginia were enumerated for standard plate count (SPC), coliform count (CC), psychrotrophic Bacteria Count (PBC), modified (rapid) Psychrotrophic bacteria count (mPBC), preliminary incubation count (PIC) and a modified pg count (MPIC). The results indicated that the petrifilm technique was not significantly different from agar pour plate methods as evidenced by correlation values, mean log differences, slopes, and Y-intercepts. The petrifilm method for mPBC yielded similar overall results (0.96, -0.283, 1.016-0.340, resp.) to the pour plate method (0.94, 0.272, 0.865, 0.684 resp.). PIC results were also not significantly different from those of the PIC (0.94, 0.044, 0.991, 0.169 resp.). CTD

1992 Schaack (MM) and Marth (EH). Survival of Listeria monocytogenes in refrigerated cultured milks and yoghurt. Journal of Food Protection 51(11); 1988; 848-852

Skim milks containing Listeria monocytogenes were fermented at 21, 30, 37 or 42 C for 15 h with Streptococcus lactis, S. cremoris. S. thermophilus, Lactobacillus bulgaricus or L. bulgaricus plus S. thermophilus (LBST). Amounts of inocula were 5.0, 1.0, 0.5, 0.1%. Yoghurt mix was inoculated with L. monocytogenes and fermented at 45 C for 5 hr. Cultured skim milks and yoghurt were stored at 4 C and sampled weekly to monitor survival of L. monocytogenes and the pH. Yoghurt was sampled Ca every 3 d for enumeration L. monocytogenes and detn. of pH. Results show that L. monocytogenes survived longest in skim milks fermented with S. monocytogenes survived longest in skim milks fermented with S.thermophilus, ranging from 4 wks in skim milk fermented at 42 C with a 5.0% inoculum (final pH 4.62) to 37 wks in skim milk fermented at 37 C with a 1.0% inoculum (final pH 4.52). When skim milks were fermented with S. lactis, L. monocytogenes survived from 2 wks (5.0% inoculum, 30 C incubation, final pH 4.20) to more than 13 wks (0.1% inoculum, 21 C, incubation, final pH 4.70). L. monocytogenes survived from 4 (final pH 4.36) to 13 (final pH 5.30) wks in milk fermented with S. cremoris. L. bulgaricus was the most detrimental to L. monocytogenes; the pathogen survived only 3 d to 1 wks in the skim milk fermented at 37 C with 0.1% inoculum. Survival of L. monocytogenes in milk fermented with LBST culture ranged from 1 (final pH 3.93) to 12 (final pH 4.41) wks in those skim milks in which the organism survived the fermentation process. L. monocytogenes survived yoghurt manufacture and from 1 (final pH 4.13) to 12 (final pH 3.93) d during refrigerated storage of the product. AS

1993 Tomar (SK). Advances in bacteriological examination of milk. Indian Dairyman 41(7); 1989; 385-388

The rapid methods for bacteriological examination of milk described in the article include Direct Epifluorescent filtration technique, ATPase method, Bactoscan method, dry culture medium method and impedance/conductance method. A list of instruments used in automation of bacteriological testing of food is also given. KAR

1994 Wester (JAJ), Hall (MS), Nelson Rich (C), Gilliland (SE), Ford (SR) and Leach (FR). Improved sensitivity of the biolumenescent determination of numbers of bacteria in milk samples. **Journal of Food Protection** 51(12); 1988; 949-954

A procedure for the measurement of bacterial ATP in raw milk using fire fly luciferase has been described. Sensitivity of the assay and time required has been reported to be 10 bacteria per ml. of raw milk in 20 minutes. CTD

Milk products

1995 Rajkowski (KT), Peele (JT) and Messer (JW). Detectability of erythromycin in eight milk products using the AOAC **Bacillus stearothermophilus** disc assay. **Journal of Food Protection** 51(11); 1988; 901-902

A comparison was made of the ability of the AOAC **Bacillus stearothermophilus** disc method using Antibiotic Medium (A4) and Penicillin in Milk (PM) assay agar to detect erythromycin in eight milk products. PM assay agar outperformed A4 agar by 470%, producing an average detectable level of 0.26 p.p.m. (range 0.16-0.37 p.p.m.) and is the medium of choice for the detection of erythromycin by this method. AS

Cheese

1996 Carini (S), Emald (GC), Naresh Kumar (C) and Das (GC). Italian cheeses. **Indian Dairyman** 41(7); 1989; 367-373

Authors after listing the important types of Italian cheeses, give brief description about their ripening period, typical var. under each type, basic steps involved in cheesemaking including milk setting, curd cutting, cooking, draining and structuring, pressing, salting and ageing. The cheese types included are Grana, Mozzarella, Provolone, Gorgonzola, Italico and Crescenza. KAR

1997 Puchades (R), Lemieux (L) and Simaro (RE). Sensitive, rapid and precise determination of L-glutamic acid in cheese using a flow-injection system with immobilized enzyme column. **Journal of Food Science** 54(2); 1989; 423-426

Glutamic acid in cheese was determined by its reaction in a packed-bed enzyme reactor containing immobilized glutamate dehydrogenase (GIHD) in a flow-injection system, measuring fluorescence of NADH generated. There was a linear relationship (r = 0.999) between log-peak height and log-glumatic acid concn. (0.01 to 0.5 mM). The detection limit was 0.005 mM for an injection vol. of 88 µL. The sample frequency was 30/h and the precision was better than 1.2% for 10 successive assays. The accuracy of the enzyme reactor-flow injection system was evaluated by comparison with HPLC results and an excellent correlation was obtained (r = 0.996). No measurable decrease in activity of the GIDH column was observed after a 3-month period. AS

1998 Singh (S), Kanawjia (SK) and Rao (KH). **Accelerated ripening of cheese from buffalo milk. Indian Dairyman** 41(1); 1989; 25-30

The inherent resistance of buffalo milk cheese towards ripening changes force the cheese manufacturers to hold it for prolonged period at refrigeration temp. which increases the cost. In this paper the cheese prepared from buffalo milk by Czulak, Burde, Presalting and goat milk supplementation methods (GMS) have been compared with respect to flavour, body and texture, glycolysis/titratable acidity, soluble protein, and lypolysis/free fatty acids. Cheese made from buffalo milk added with **Lactobacillus casei** recorded normal score after 2 months and the flavour improved markedly thereafter and remained constant upto 8 months. Addition of lipase and protease singly did not improve the flavour considerably. But as a mixture they improved the flavour, body and texture of cheese in 6 months. Commercial enzymes like flavourage and naturage also improved flavour of buffalo milk cheddar cheese in ripening period of 6 months. KAR

Dadih

1999 Hosono (A), Wardojo (R) and Otani (H). Microbial flora in dadih, a traditional fermented milk in Indonesia. **Lebensmittel-Wissenschaft und-Technologie** 22(1); 1989; 20-24

In the present study, the microbiological characteristics of ‘dadih’ a traditional fermented milk originated in West Sumatra, Indonesia was investigated. This product was examined for counting and isolation of all microbial flora by use of Lactobacilli Culture Agar and BCP Plate Count Agar. Bacterial number in ‘dadih’ was 4.1 x 10^8 /g on average, and the dominant strains of all isolates was lactic acid bacteria. Sp. of the lactic acid bacteria were identified as **Streptococcus faecalis** subsp. **liquefaciens**, **S. cremoris**, **S. lactis** subsp. **diacetylactis**, **S. lactis**, **Leuconostoc paramesenteroides**, **Lactobacillus casei** subsp. **casei** and **L. casei** subsp. **rhamnosus**. Among these sp. of lactic acid bacteria, **Leu. paramesenteroides** was the dominant strain. The other bacteria were identified as **Micrococcus varians**, **Staphylococcus saprophyticus** and **Bacillus cereus** var. **mycoides**. An appreciable number of yeasts was also found as a number of 1.1 x 10^7 /g, of which sp. were identified as **Endomyces lactis**. AS

Dahi

2000 Gandhi (DN) and Muralidhara Rao (S). Dahi and acidophilus milk. **Indian Dairyman** 41(6); 1989; 325-328

Types of dahi (fermentation by **Streptococcus lactis** sp. **diacetylactis**) and acidophilus milk (fermentation by **Lactobacillus acidophilus**) produced in India, their properties and comp., techniques of preparation, general acceptance by the consumers and the latest attempts made to improve the taste and flavour of these products have been covered. KAR

Khoa

2001 Rajorhia (GS). Innovative technologies for the manufacture of khoa powder and gulabjamun mix. Indian Dairyman 41(1); 1989; 31-34

Methods for manufacturing khoa powder by tray drying, fluidized bed drying, and roller drying process have been described along with the flow sheet. Preparation of gulabjamun mix powder from spray dried milk and the characteristics of the powder have also been covered. KAR

Milk powders

2002 O'Mahony (JG) and Synnott (EC). Influence of sample shape and size on shelf-ignition of a fat-filled milk powder. Journal of Food Engineering 7(4); 1988; 271-280

Whey

2003 Flynn (A), McKenna (L), Keamey (RD) and Connolly (JF). Bioavailability of calcium and zinc in a whey mineral complex. Irish Journal of Food Science and Technology 12(1/2); 1988; 41-51

The bioavailability of Ca and Zn in a whey mineral complex (WMC) prepared from acid casein whey was determined in rats by slope ratio assay methods. Diets containing graded levels of Ca (45-215 mg/100 g) as WMC or calcium carbonate were fed to groups of 6 weanling rats for 27 days. Bioavailability of Ca in WMC relative to calcium carbonate was determined from the ratio of the slopes of the linear regressions for femur and tibia Ca on Ca intake. The relative bioavailability of Ca in calcium carbonate was 0.88-0.97. For assay of Zn bioavailability, diets containing graded levels of Zn (1.2-7.7 mg/kg) as WMC or Zn sulphate were fed to groups of 6 weanling rats for 19 days. Relative bioavailability of Zn in WMC was 0.87-0.91, as determined from the ratio of the slopes of the linear regressions for wt. gain and tibia Zn on Zn intake. The high bioavailability of Ca and Zn in WMC indicates that this complex may be suitable for use as a dietary mineral supplement. AS

2004 Gandhi (DN). Whey utilization for beverages production. Indian Dairyman 41(1); 1989; 35-36

This article after stressing the importance of whey gives a brief review of the work done for its utilization as a fermented beverage. KAR

Whey proteins

2005 Barry (F), Beechinor (F) and Foley (J). High performance liquid chromatography analysis of whey protein products. Irish Journal of Food Science and Technology 12(1/2); 1988; 25-39

Whey protein isolates (WPI) recovered by ion-exchange and whey protein conc. (WPC) recovered by ultrafiltration were compared in terms of gross comp. and in terms of more detailed protein content using both size-exclusion and reverse-phase high-performance liquid chromatography. Hydrochloric acid casein and Cheddar cheese WPIs were of higher purity than the WPCs, with lower ash, lactose and fat content. The protein of the WPI product appeared to be less denatured than the WPC products as indicated by reverse-phase HPLC and solubility at pH 4.5. The WPI products had higher Na but lower Ca and K levels than the WPC products. HPLC analysis showed some differences in the protein comp. of the two products; differences in alpha-lactalbumin content were observed and the material eluting at the void of the size-exclusion column, which was assumed to be lipoprotein, as well as the non-protein N fraction were absent from the WPI samples studied. AS

MEAT AND POULTRY

Meat

2006 Barbut (S) and Mittal (Gs). Rheological and gelation properties of reduced salt meat emulsions containing polyphosphates. **Journal of Food Processing and Preservation** 12(4); 1989; 309-326

The gelation patterns and rheological properties of poultry meat emulsions prepared with average and reduced NaCl levels (2.5% and 1.5% resp.) and with three polyphosphates (0.5% tripolyphosphate = TPP, hexametaphosphate = HMP, or sodium acid pyrophosphate = SAPP) added to the reduced salt emulsion were studied. Using 2.5% NaCl resulted in the highest yield stress value as compared to all the other treatments; SAPP addition significantly reduced yield stress of the raw emulsion. The relationship between the shear rate and shear stress of the raw emulsions was nonlinear and appears to resemble the Bingham pseudoplastic behaviour. Plots of the modulus of rigidity (G) versus cooking temp. indicated differences in gelation patterns and max. G for the different treatments. The highest G was observed in the 2.5% NaCl emulsion followed in decreasing order by the emulsions containing 1.5% NaCl + 0.5% SAPP, 1.5% NaCl + 0.5% HMP, 1.5% NaCl, and the 1.5% NaCl + 0.5% TPP treatment. AS

2007 Kamble (VJ), Bonde (HS), Kulkarni (KD) and Kulkarni (DN). Quality aspect of Osmanabadi goat meat. **Journal of Food Science and Technology, India** 26(2); 1989; 99-101

The Osmanabadi goats were categorised into age groups of (a) 6 to 8 months, (b) 8 to 10 months, (c) 10 to 12 months and (d) 12 to 14 months for studies. The % decrease in moisture content from meat of those of (a) group to (d) group was 74.07 to 63.35. The protein content was max. in (a) group (17.4%); for other groups the protein content was almost the same (16.26 to 16.55%). The ether extract content increased with increase in age of male kids. Ash content decreased with increase in age. The carbohydrate content decreased with increase in age. The carbohydrate content estimated by difference ranged from 2.86 to 3.30%. The above contents were almost same in different age groups. Test panel results showed that the colour, appearance and acceptability of lean meat was excellent in the (b) and

(c) age groups; however, the acceptability of lean meat from (a) and (d) age group was also good. The tenderness decreased with increase in age. The meat was more juicy at lesser age. In male kids, selected for slaughter, the lean meat, bone, carcass length and rib eye muscle area in each group and high significant correlation with dressed carcass wt. of respective age group in male kids. Prediction equation would help in predicting dressed carcass, lean and bone from slaughter wt. as also dressed carcass from carcass length. The meat from the (b) showed better comp. from the point of view of nutrition and leanness. The Sensory quality of this sample was better than other samples. There was hardly any advantage in rearing the kids beyond 10 months of age, which results in slower increase in dressed carcass and weight reduction in lean percentage. AS

Beef

2008 Abu-baker (A), Reagan (JO), Vaughters (HM), Tounsend (WE), Carpenter (JA) and Miller (MF). Processing, sensory and chemical properties of Wieners prepared from carbon dioxide brine and conventionally chilled beef raw materials. Journal of Food Science 54(2); 1989; 277-279

2009 Dickson (JS). Reduction of bacteria attached to meat surfaces by washing with selected compounds. Journal of Food Protection 51(11); 1988; 869-873

2010 Rice (DR), Neufer (PA) and Sipos (EF). Effects of soy protein blends, fat level, and cooking methods on the nutrient retention of beef patties. Food Technology 43(4); 1989; 88-97

2011 Tanchotikul (U), Godber (JS), Arganosa (GA), McMillin (KW) and Shao (KP). Oxidative stability and textural quality of restructured beef roasts as affected by end-point cooking temperatures, storage and the incorporation of surimi. Journal of Food Science 54(2); 1989; 280-283

2012 Xiong (YL) and Anglemier (AF). Gel electrophoretic analysis of the protein changes in ground beef stored at 2 C. Journal of Food Science 54(2); 1989; 287-290

Beef patties

2013 Bentley (DS), Reagan (JO) and Miller (MF). Effects of gas atmosphere, storage temperature and storage time on the shelf-life and sensory attributes of vacuum packaged ground beef patties. Journal of Food Science 54(2); 1989; 284-286

2014 Berry (BW) and Leddy (KF). Effects of freezing rate, frozen storage temperature and storage time on tenderness values of beef patties. Journal of Food Science 54(2); 1989; 291-296

Beef steaks

2015 Ahmad (HA) and Marchello (JA). Effect of gas atmosphere packaging on psychrotrophic growth and succession on steak surfaces. Journal of Food Science 54(2); 1989; 274-276

Mutton

Sheep

2016 Mahendrakar (NS), Dani (NP), Ramesh (BS) and Amla (BL). Studies of influence of age of sheep and post-mortem carcass conditioning treatments on muscular collagen content and its thermolability. **Journal of Food Science and Technology, India** 26(2); 1989; 102-105

Male lambs, male yearlings and ewes-were sacrificed and thigh muscles (SM and ST) were used within 1 hr post-mortem for studies on age-related changes. For studies on postmortem carcass conditioning treatments, ewe carcasses were subjected to either Achilles tendon suspension at 2-3 C for 24 hr (direct chilling, C_1) or pelvic suspension at RT (26 plus or minus 2 C) for 7 h followed by chilling at 2-3 C for 17 h (delayed chilling, C_2) or left untreated (unconditioned, fresh, F). SM and ST muscles were dissected out within 1 h post-mortem from F-carcasses and after 24 h post-mortem from conditioned (C_1 or C_2) carcasses. The effect of age of the animal is marginal ($P > 0.05$) on collagen content and very significant ($P < 0.001$) on its solubility on heating-solubility decreasing with age. The stretching/contraction of muscles due to post-mortem conditioning of ewe carcasses had marginal ($P > 0.05$) influence on both content and solubility of collagen. Cooking under pressure resulted in significantly ($P < 0.001$) greater solubility than cooking without pressure. The interaction age x cooking was highly significant ($P < 0.001$) whereas conditioning x cooking was not significant ($P > 0.05$). AS

Lamb

2017 Anderson (ME), Huff (HE), Naumann (HD) and Marshall (RT). Counts of six types of bacteria on lamb carcasses dipped or sprayed with acetic acid at 25 C or 55 C and stored vacuum packaged at 0 C. **Journal of Food Protection** 51(11); 1988; 874-877

This study evaluates the sanitizing effectiveness of applying, by spraying or dipping, 1.5 or 3.0% acetic acid at either 25 C or 55 C to freshly slaughtered lamb carcasses. After vacuum packaging and during extended storage at 0 C, samples were examined for microbial populations. Each treatment reduced counts significantly compared with counts of untreated controls. Numbers of gram negative bacteria and lactobacilli were affected significantly by the temp. of acid solutions. Other variables caused insignificant differences in the amounts that counts were reduced by sanitization. Overall, dipping in 3% acetic acid at 55 C was the most effective treatment. AS

Pork

2018 Astiasaran (I), Beriain (MJ), Melgar (J), Sanchez-Monge (JM), Villanueva (R) and Bello (J). Comparative study of the characteristics of white pork cured hams elaborated with different technologies. **Revista de Agroquimica y Tecnologia de Alimentos** 28(5); 1988; 519-528 (Es).

2019 Mendonca (AF), Molins (RA), Kraft (AA) and Walker (HW). Effects of potassium sorbate, sodium acetate, phosphates and sodium chloride alone or in combination on shelf-life of vacuum packaged pork chops. Journal of Food Science 54(2); 1989; 302-306

2020 Peng (IC), Yasosky (JJ) and Judge (MD). Sodium retention in prerigor and postrigor ground pork. Journal of Food Science 54(2); 1989; 297-298

2021 Van Laack (RLJM), Smulders (FJM) and Van Roon (PS). Functional properties of pre-rigor pork. Hot vs cold processing of cooked shoulders and hams. Journal of Food Science 54(2); 1989; 307-310

2022 Wiley (EL), Reagan (JO), Carpenter (JA), Anderson (JB) and Miller (MF). Effects of brine and carbon dioxide chilling systems on hot-processed vacuum-packaged pork. Journal of Food Science 54(2); 1989; 299-301

Products

Meat

2023 Korkeala (H), Suortti (T) and Makela (P). Ropy slime formation in vacuum-packed cooked meat products caused by homofermentative lactobacilli and a Leuconostoc species. International Journal of Food Microbiology 7(4); 1988; 339-347

This paper deals with the cause of the formation of ropy slime on the surface of vacuum-packed cooked meat products. Two different homofermentative lactobacilli and a Leuconostoc strain were isolated from different ropy vacuum-packed meat products. The strains were able to produce slime experimentally on vacuum-packed cooked sausages. The slime had a mol. wt. in the range of 70000-30000 and contained glucose and galactose in a ratio 10:1-10:2. The formation of ropy slime also occurred on sausages without added sugars. AS

Sausages

2024 Asplund (K), Nurmi (E), Hill (P) and Hirn (J). The inhibition of the growth of Bacillus cereus in liver sausages. International Journal of Food Microbiology 7(4); 1988; 349-352

The growth of Bacillus cereus is a problem in liver sausage especially when the sausages are stored at high temp. Even concn. of > 10_6 g have been detected. This study reports that when combining glucono-delta-lactone, sodium erythorbate and citric acid with sodium nitrite and salt, the growth of B. cereus could be delayed or totally inhibited. AS

2025 Borch (E), Nerbrink (E) and Svensson (P). Identification of major contamination sources during processing of emulsion sausage. International Journal of Food Microbiology 7(4); 1988; 317-330

The extent of contamination of an emulsion type of sausage with lactic acid bacteria was determined along the processing line. This was done by aseptically removing sausages after five different processing stages (heat processing, chilling, cold storage, cutting down and packing). Removed sausages were vacuum-packed and stored at 8 C. The microbial growth was followed during storage and microbiological shelf-life obtained at the different stages of the processing was determined. The spoilage flora of stored sausages was identified/grouped. Two major hygienic problems were identified: (1) a heat tolerant flora of **Lactobacillus viridescens** which survived the heat processing and was never outgrown by the recontaminating flora; (2) recontamination with a flora dominated by **Lactobacillus** sp. group 5, which occurred in the cold storage room; this flora dominated in the absence of **L. viridescens**. The heat tolerant **L. viridescens** SMRICC 193 survived at 68 C for 40 min. Being exposed to a slowly increasing temp., only a 10 cfu/ml decrease took place when the temp. increased from 60 C to 70 C over a period of 30 min. AS

2026 Garriga (M), Compte (M), Casademont (G) and Moreno-Amich (R). The influence of carbohydrates in the fermentation of dry sausages. **Revista de Agroquimica y Tecnologia de Alimentos** 28(4); 1988; 548-557 (Es).

The evolution of microbial population, lactic acid and pH in 5 batches of dry sausages manufactured with good quality pork (pH 5.7-6.2) added with different sugars (Sucrose, Lactose, Glucose, Glucose-Maltose mixture) and commercial starters (**Pediococcus pentosaceus** 751, Micrococci and Lactobacilli-non pathogenic Staphylococci) throughout drying was studied. By analysis of variance, taking the sugar as a variable, the following results were obtained: the lactobacilli and **Micrococcaceae** number's were not affected by the use of certain sugar whereas the smaller count of **Enterobacteriaceae** was obtained in glucose or glucose-maltose added batches. The correlations obtained between lactic acid and pH ($r = - 0.88$) and between lactic acid and sugars ($r = - 0.69$) were significant ($P < 0.001$). At the end of fermentation time the pH levels showed significant differences between the control batch and the rest except for lactose series. By the end of drying the differences were not significant between batches with different sugars added while they were different with the control. AS

Poultry

Chickens

2027 Anand (S K), Mahapatra (CM), Pandey (NK) and Verma (SS). Effect of draining on microbial quality of dressed chicken. **Indian Journal of Poultry Science** 23(4); 1988; 330-331

Freshly dressed chickens were chilled in slush ice for 4 h and kept for draining for 5, 10 and 15 min. Although 15 min draining reduced the total bacterial count of the abdominal cavity, but no change was observed in the coliform counts. Total plate counts raised to $\log_{10}$ 3.93 after 15 min of draining from an initial count of $\log_{10}$ 3.68. No significant increase in Staphylococcal and coliform counts was observed. Thus it is concluded that prolonged draining of carcasses may not be useful in reducing the bacterial load of dressed birds. KAR

Pigeons

2028 Keshri (RC) and Sharma (N). Slaughter and carcass characteristics of pigeons (Columba livia domestica). **Indian Journal of Poultry Science** 23(4); 1988; 275-280

Four hundred squabs and adult pigeons of Indian Gola breed were assesssed for the effect of age and sex on slaughter and carcass traits. The mean pre-fasting live wt. ranged from 239.6 to 319.4 g. Adults had higher wt. than squabs. Males were heavier than females. Percent shrinkage due to fasting averaged 3.1 and the difference between squabs and adults was non-significant due to 6 and 12 h of fasting, resp. The mean dressing % of pigeons was 88.3. Variation in the % due to age or sex was non-significant. Head and leg yields of pigeons were 4.9 and 1.9% resp. The evisceration yield of pigeons ranged from 68.9 to 71.8% and the giblets comprising of heart (1.2%), liver (2.7%) and gizzard (1.9%) were 5.8%. The ready-cook yield was between 75 to 77% and the difference in yield between squabs and adult was non-significant. Per cent yields were higher in females than males. AS

Quails

2029 Singh (RP), Anand (SK) and Panda (B). Effect of lactic acid and vacuum packaging on shelf-life of quail carcasses under refrigerated storage. **Indian Journal of Poultry Science** 23(4); 1988; 326-329

After ascertaining that 2% lactic acid dipping of carcasses gives good results, the carcass (dark and light meat) dipped in 2% lactic acid were packed with or without vacuum in high density polyethylene (330 gauge) pouches and stored at 4 plus or minus 0.5 C for 12 days. Dipped dark meat showed consistently higher pH values than light meat and dipped meat had less water holding capacity than that of untreated carcass. The rate of increase of thiobarbituric acid (TBA) value was relatively slower in vacuum packed than in non-vacuated samples and in dipped than in untreated carcass during storage. Dark meat had higher TBA value than light meat in both control and treated carcasses throughout the storage. Dipped carcasses showed a small reduction in total plate count and Staphylococcal count initially. Acid treatment destroyed coliforms completely and also extended the lag phase of bacterial growth. No adverse effect of 2% lactic acid treatment on tenderness, colour, flavour and overall acceptability attributes of quail meat was observed. It is concluded that high density polyethylene pouches are unsuited for packaging quail meat and acetic acid treatment had limited value in extending the shelf-life for meat up to 10 days as against 8 days for untreated carcass at refrigeration temp. KAR

Turkeys

2030 Barbut (S), Draper (HH) and Hadley (M). Effects of freezing method and antioxidants on lipid oxidation in turkey sausage. Journal of Food Protection 51(11); 1988; 878-882

Rosemary oleoresin (200 p.p.m.) was compared to a commercial antioxidant mixture of butylated hydroxyanisole (BHA), butylated hydroxytoluene (BHT) (200 p.p.m.) and citric acid in frozen and freeze dried breakfast sausages prepared with 18% mechanically deboned turkey meat. Analysis for malondialdehyde (MDA) revealed that both antioxidant treatments inhibited lipid oxidation during 5 wks. of storage. Rosemary oleoresin was comparable in activity to the commercial antioxidant mixture in the freeze dried products but not in the frozen products. Fatty acid analysis at the beginning and the end of storage revealed a selective decrease in certain long chain polyunsaturated fatty acids which was not related to treatment. Sensory analysis yielded a strong preference for the frozen sausages which was attributable to the poorer texture of the freeze dried sausages rather than to flavour deterioration. AS

Poultry products

Eggs

2031 Shrivastav (AK), Panda (B) and Panda (BK). Effect of packaging and storage on keeping quality of pickled quail eggs. Indian Food Packer 43(3); 1989; 5-9

Pickled quail eggs were seasoned for 24 and 72 h and packed without solution in double sealed LDPE bags, stored at room temp. (26 C, RH 75%) and at refrigeration temp., (5 C) and assessed for their keeping quality at monthly intervals over a period of 6 months. The results of moisture loss, pH changes, bacterial count and organoleptic evaluation indicated that the pickled quail eggs could be packed without pickle solution in double sealed LDPE bags after 24 h of seasoning and could be safely stored at room temp. and refrigeration temp. for 4 and 6 months resp. KAR

Eggs

2032 Singh (RP) and Panda (B). Keeping quality of pickled quail eggs under different packaging and storage conditions. Indian Journal of Poultry Science 23(4); 1988; 259-266

Quail eggs pickled in 50% vinegar with added salt and spices and subsequently stored in rigid (glass or plastic) containers with pickle solution or in flexible (HDPE, PP and PFP laminate) pouches without pickle solution at mean ambient (24 C, 58% RH) and at refrigeration (5 plus or minus 1 C, 80-85% RH) temp. for 6 and 12 months, resp. were evaluated for physical and chemical attributes and for keeping quality. Penetration of acetic acid and salt was faster in egg albumen than yolk and under ambient than in refrigeration storage. Albumen lost moisture with concomitant increase in its protein and shear force values during pickling and storage. Refrigerated pickles showed higher colour stability. Mean halophilic counts in pickled eggs remained fairly low and no coliforms, anaerobes, Salmonellae, coagulase positive Staphylococci and fungi were detected throughout the storage. Sensory quality of the product was more dependent on storage temp. than packaging treatments. HDPE (330 G) was efficient and cost-effective alternative to rigid containers for storage of pickled eggs without pickle solution upto 4 and 12 months at ambient and refrigeration storage, resp. KAR

2033 Ziegler (GR) and Rizvi (SSH). Predicting the dynamic modulus of mixed gelatin-egg white gels. **Journal of Food Science 54(2); 1989; 430-436**

The storage shear modulus (G') of mixed gelatin-egg white protein gels was modeled using a modified Takayanagi approach. Ternary phase diagrams for two gelatin-egg white protein-aqueous solvent systems are presented. The composite modulus, G' of mixed gels was found to be determined by the elastic properties of the individual gellants, their thermodynamic compatibility in a common solvent and their mutual reactivity. Rheological data suggested the occurrence of an interpenetrating network morphology in single phase gels. Gelatin and egg white proteins were more compatible in water than in 0.6 M NaCl-0.2 M sodium phosphate buffer (pH 6.0). AS

Egg yolks

2034 Aihara (H), Watanabe (K) and Nakamura (R). Degradation of cholesterol in hen's egg yolk and its low density lipoprotein by extracellular enzymes of Rhodococcus equi No. 23. **Lebensmittel-Wissenschaft und-Technologie 21(6); 1988; 342-345**

The degradation of cholesterol in hen's egg yolk and its low density lipoprotein (LDL) was investigated with the extracellular enzymes of Rhodococcus equi No. 23. It was observed by incubations of egg yolk and LDL isolated from egg yolk with the culture filtrate from R. equi No. 23 that cholesterol in their samples was degraded into th nonsteroid compound, and the simultaneous action of cholesterol oxidase and phospholipase C was needed to degrade greatly LDL-cholesterol. Only 10% LDL-cholesterol was degraded using cholesterol oxidase in the same units S described above in the absence of phospholipase C. AS

2035 Morgan (JN) and Armstrong (DJ). Wide-bore capillary gas chromatographic mathod for quantification of cholesterol oxidation products in egg yolk powder. **Journal of Food Science 54(2); 1989; 427-429**

A wide-bore capillary gas chromatographic (GC) method was developed for quantification of cholesterol oxidation products in egg yolk powder. Baseline separations were achieved between 7 alpha- and 7 beta- hydroxycholesterol, cholesterol, cholesterol-5 alpha, 6 alpha-epoxide, cholesterol-5 beta, 6 beta-epoxide and 7-ketocholesterol chromatographed as the trimethylsilylated sterols. Excellent response linearity was obtained for each cholesterol oxidation product, permitting reliable quantification. Recoveries from freeze-dried egg yolk spiked with various levels of cholesterol oxidation products ranged from 78.2 to 95.1%. The coeff. of variation compared favourably to those for packed column GC methods. AS

Quail eggs

2036 Singh (RP) and Panda (B). Suitability of flexible packaging materials for storage of pickled quail eggs. **Journal of Food Science and Technology, India** 26(2); 1989; 64-67

Quality characteristics of quail eggs pickled in oil-based gravy containing 3% salt and 2% acetic acid and subsequently stored in high density polyethylene (HDPF, 330 G), polypropylene (PP, 140 G), 12 um polyester/0.09 mm aluminium foil/150 G LDPE (PFP) laminated pouches or glass jar were investigated during 9 and 15 months of ambient (19-38 C, 36-85% RH) and refrigeration (4-6 C, 80-85% RH) storage, resp. The albumen and yolk reached equilibrium (4.7-4.8) within 2 and 4 days of ambient and refrigeration storage, resp. Egg pickle stored in PP showed max. wt. loss followed by HDPE and glass jar but negligible wt. loss in PFP laminate. TBA values increased progressively during storage. Refrigerated pickles showed better colour stability. No coliforms, anaerobes, **Salmonella**, and coagulase-positive **Staphylococci** were detected in pickled eggs. Sensory quality of the product declined on storage. HDPE was found to be a cost-effective alternative to glass jar for storage of pickled eggs upto 8 and 15 months of ambient and refrigeration storage, resp. AS

SEAFOODS

2037 Gordon (DT). Minerals in seafoods. Their bioavailability and interactions. **Food Technology** 42(5); 1988; 156-160

Review. 26 references. BV

2038 Ito (K) and Hori (K). Seaweed. Chemical composition and potential food uses. **Food Reviews International** 5(1); 1989; 101-144

Chemical components of seaweeds-carbohydrates, proteins and low mol. wt. nitrogenous compounds, minerals, lipids, vitamins, volatile compounds, and pigments-are reviewed in relation to potential food uses. The nutritive values of seaweeds are briefly discussed . Bioactive compounds found in seaweeds are also discussed for pharmaceutical uses or toxicity. Finally, practical uses of seaweeds as food in Japan are described. AS

2039 Lanier (Tc), Martin (RE) and Bimbo (AP). Nutritional implications of increased consumption of engineered seafoods. **Food Technology** 42(5); 1988; 162-165

Reviews the nutrient content and nutritional implications of surimi-based products, and describes how the products can be tailored to meet the changing interests and diets of todays consumers. 10 references. BV

2040 Radhakrisnnan (AG) and Antony (PD). Pesticide residues in marine fishes. **Fishery Technology** 26(1); 1989; 60-61

Pesticide residues (BHC, lindane, heptachlor, aldrin, dieldrin, endrin and DDT) in black pomfret (**Parastromateus niger**). mackerel (**Rastrelliger kanagurta**), marine vala (**Chirocentrus** sp.) and tuna (**Euthynnus affinis**) are reported. Pesticide residue was highest in black pomfret followed by tuna, vala and mackerel. However, these levels are well below the level prescribed by Food and Drug Administration to cause any health hazard. KAR

2041 Singh (S) and Rai (T). Potential uses of lactose in food industry. **Indian Dairyman** 41(7); 1989; 379-382

Lactose has some unique physico-chemical properties that make it useful in a number of products. The properties described in brief include sweetness and solubility, reducing property, protein stabilising quality, influence on crystallisation habits, absorptive properties, dispersing nature and selective fermentation. KAR

2042 Vondruska (J), Steven Otwell (W) and Martin (RE). Seafood consumption, availability, and quality. **Food Technology** 42(5); 1988; 168-172

Lobsters

2043 Williams (UP), Kiceniuk (JW), Fancey (LL) and Botta (JR). Tainting and depuration of taint by lobsters (**Homarus americanus**) exposed to water contaminated with a No. 2 fuel oil. Relationship with aromatic hydrocarbon content in tissue. **Journal of Food Science** 54(2); 1989; 240-243

Lobsters (**Homarus americanus**) were exposed to a pulse of diesel oil and held for 21 days to depurate. Taste panels revealed a highly significant difference between samples, as well as a preference for, the untreated samples at days 10 and 11. The odour of the raw treated samples differed significantly from that of the control at each of the sampling times. Cooking appeared to remove the oily, odour from the raw lobster. Significantly elevated concn. of total aromatics were found in the hepatopancreas of both sexes at days 3-4 and 10-11 and in the tail muscle of male and female lobsters 10-11 days after initial exposure and decreased thereafter. Tainting of lobsters can occur within 10 days of exposure to diesel, and this effect can be reversed within 20 days after initial exposure. AS

Shrimps

2044 An (H), marshall (MR), Otwell (WS) and Wei (CI). Species identification of raw and boiled shrimp by a urea gel isoelectric focusing technique. **Journal of Food Science** 54(2); 1989; 233-236

Isoelectric focusing (IEF) using 9.2M urea and 6.2% (v/v) ampholytes in a polyacrylamide gel was used to separate protein banding patterns for sp. identification of pink, white and rock shrimp. A 17-h focusing time was used. IEF of water extracts of raw shrimp showed excellent banding patterns useful for distinguishing each shrimp sp. For cooked shrimp, water and sodium dodecyl sulphate (SDS) were better protein extractions. Detection of shrimp sp. in a mixture was difficult due to similar banding patterns between closely related sp. AS

2045 Krzynowek (J) and Panunzio (LJ). Cholesterol and fatty acids in several sp. of shrimp. Journal of Food Science 54(2); 1989; 237-239

The cholesterol value for several sp. of shrimp from several different geographical locations was determined. The overall average for all the samples was 152 plus or minus 15 mg/100g of edible portion of shrimp. Two samples of Pandalus borealis, Gloucester prawns and Canadian prawns, accounted for the low (136 mg/100g) and the high (186 mg/100g) limits, resp., of the range of cholesterol. All shrimp were low in fat at about 1%. Eicosapentaenoic and docosahexaenoic acids were present at about 30% of the total fatty acids, providing about 0.20g/100g in the edible portion. AS

2046 Lekshmy Nair (A) and Prabhu (PV). Studies on the chemical and nutritional quality of protein powders isolated from shrimp waste. Fishery Technology 26(1); 1989; 56-59

Protein powders were prepared from processing waste of prawns either by mechanically squeezing the shell and freeze drying the resultant aqueous extract or by treating the shell with 0.5% NaOH, filtering and freeze drying the filtrate. The % yield of shrimp extract powder from prawn shells ranged from 7.41 to 8.00 with a moisture range of 3.56 to 4.44%. The mineral content and the essential amino acid contents of the powder are given. The powder is high in lysine; phenylalanine plus tyrosine and valine are present in more than the required amounts and threonine and tryptophan are present in adequate amount. Consumer acceptance and nutritional quality of the protein powders showed that expeller separated powder is better than mild alkali extracted powder. KAR

Fish

2047 Ackman (RG). Concerns for utilization of marine lipids and oils. Food Technology 42(5); 1988; 151-155

This review focuses on the concerns associated with the consumption of fish, shellfish, fish lipids, and fish oils. Discusses the changing trends in seafood consumption and some of the health benefits associated with eicosapentaenoic acid and docosahexaenoic acid, and other fish components. Autoxidation of fishery products, safety of fish, shellfish and fish oils and conc. 81 references. BV

2048 Balachandran (KK) and Vijayan (PK). Tin coating requirements in fish cans. Fishery Technology 26(1); 1989; 33-35

Prawn, crab and clam meat were processed in cans having reduced internal tin coating of 5.6 g/sq.m. (GSM) compared to 11.2 GSM in conventional cans and stored for 5 wk and observations were made for degree of blackening. Results showed that 5.6 GSM cans developed no blackening if the lacquer film was perfect with no exposure of metal. These cans behaved normally when used for canning prawns but were found unsuitable for canning crab meat or clam meat as the can walls and the contents developed discolouration. KAR

2049 Doe (PE) and Heruwati (ES). A model for the prediction of the microbial spoilage of sundried tropical fish. **Journal of Food Engineering** 8(1); 1988; 47-72

A mathematical model has been developed which simulates sun-drying of tropical low-fat fish sp., salted or unsalted prior to drying. Measurements of the growth rates of two sp. of bacteria and 13 sp. of moulds isolated from partially-dried and dried tropical fish are combined into a three-dimensional figure which shows the relative dominance of the microorganisms under different combinations of temp. and water activity. Measured bacterial growth rates are used to predict bacterial levels during drying. The predictions are compared with measurements from a series of sun-drying trails on two fish sp. in Indonesia. AS

2050 Gjerstad (D). Prevention of infestation by **Dermestes maculatus** Degreer in East African dried fish by solar treatment. **Fishery Technology** 26(1); 1989; 22-24

East African sun-dried **Labeo horie** fish with 11.58% moisture was stored for 3 to 6 months when the fish became heavily infested with **Dermestes maculatus**. They were exposed to sunlight in one layer (4 cm) and 4 layers (20 cm thick). The temp. reached 60 C and sun-drying for 6-8 h caused 100% mortality of the insect while pests were not completely killed in 4-layered spread. Wt. losses of 1.2 and 10.2% were recorded, max. loss being at the top layer. The fish became bitter due to drying and there was loss in quality also. KAR

2051 Gjerstad (D). Prevention of infestation by **Dermestes maculatus** Degreer in East African dried fish using pyrethrum and piperonyl butoxide. **Fishery Technology** 26(1); 1989; 25-29

East African sun-dried fish **Labeo maculatus** with 11.5% moisture content was dipped for 4 s in pyrethrum solution of concn. 0.009 to 0.36% and piperonyl butoxide of concn. 0.018 to 0.144% and stored for up to 6 months and the insecticidal residue was determined at 1 wk, 2, 4 and 6 months intervals. All analyses showed residues above the FAO/WHO/MRL; exceeding factors of between 7.6 (22.9 p.p.m.) and 1.6 (5.3 p.p.m.) were found for pyrethrum while exceeding factors between 5.1 (102 p.p.m.) and 1.7 (33.1% p.p.m.) were found for piperonyl butoxide after 6 months storage at ambient temp. Insecticide treated fish irrespective of the dip concn. were found less susceptible to infestation by **Dermestes maculatus** than samples of untreated fish. No dry wt. losses due to insect infestation of fish were recorded, however, moisture evaporation caused wt. losses between 6 and 8% during the period. KAR

2052 Gopalakrishna Iyer (TS) and Shrivastava (KP). Incidence and low temperature survival of Salmonella in fishery products. **Fishery Technology** 26(1); 1989; 39-42

Salmonella was isolated from 12% of peeled deveined shrimps, 10% of headless shrimps, 14% of peeled undeveined shrimps, 17% lobsters, 14% of cuttle fish, 25% of cat fish, and 20% of seer fish (all frozen) collected from fish processing factories in Cochin (India) and retail market samples from Bombay (India). One per cent of fish meal, 4% of dried non-penaeid prawn and 23% of sea beach sand showed incidence of the organism. **Salmonella** was also isolated from 2 and 4% of the swab samples of utensil surfaces and the floor surface of the processing hall resp. as well as from 1% of the process water tested. All the **Salmonella** serotypes were resistant to freezing at -40 C, but during subsequent storage at -20 C. There was some difference between the serotypes with regard to their viability, **S. paratyphi** B. being the most resistant which survived upto 9 months while **S. saintpaul** the least resistant being survived for 5 months only. KAR

2053 Hafsteinsson (H), Parker (K), Chivers (R) and Rizvi (SSH). Application of ultrasonic waves to detect sealworms in fish tissue. **Journal of Food Science** 54(2); 1989; 244-247

The potential of employing ultrasonic waves to detect sealworms embedded deep in the fish musculature was demonstrated. Images were made to sealworm-infested cod by using both the scanning laser acoustic microscopic technique, as well as the pulse-echo technique at 10MHz. Also, attenuation of ultrasound in the frequency range from 1.0 to 12.25 MHz was studied in Atlantic cod (**Gadus morhua**), haddock (**Melanogrammus aeglefinus**), ocean catfish (**Anarhichas lupus**), and the parasitic sealworm (**Phocanema decipiens**). The difference in the attenuation of ultrasound in sealworms and in fish tissue increased as a function of frequency. The differences between ultrasonic properties (attenuation and backscatter) of fish tissue and sealworms was attributable to the high collagen content of the sealworms. The differences were sufficiently large at 10 MHz that sealworms could be detected in over 4 cm thickness of fish tissue. AS

2054 Kaul (PN), Krishna Iyer (H) and Kandoran (MK). Adoption of recommended quality control practices by fish processing factories. **Fishery Technology** 26(1); 1989; 62-66

Response to mailed questionnaires from 31 fish processing factories in India revealed that for the 55 recommended practices in quality control the percentage of adopters ranged from 21.43 to 100. The average adoption index was 84.48 and it was not related to any of the five variables studied. Rate of rejection or reprocessing at the factory itself was highly correlated with the amount of water used per tonne of processed material. KAR

2055 Kinsella (JE). Fish and seafoods. Nutritional implications and quality issues. **Food Technology** 42(5); 1988; 146-150

This article reviews the role of fish and seafoods in the diet.

Aspects discussed includes nutrient content of seafoods, the potential prophylactic effects of n-3 polyunsaturated fatty acids, particularly eicosapentaenoic acid and decosahexaenoic acid. Also discussed is the challenges currently facing the seafood industry namely that of providing products of a consistently high quality. 63 references. BV

2056 Levin (RE), Witkowski (R), Meirong (Y) and Goldhor (S). Preparation of fish silage with phosphoric acid and potassium sorbate. Journal of Food Biochemistry 12(4); 1989; 253-259

Silage prepared solely from ground hake frames and ground entrails plus frames (1:4, w/w) acidified to a pH of 4.0 with phosphoric acid and with the addition of 0.1% potassium sorbate underwent enzymatic liquefaction after several wks storage at 20 C without microbial development. With silage prepared with frames and phosphoric acid by without potassium sorbate, oxidative surface yeasts were the only spoilage microorganisms. With silage prepared from entrails and frames with just phosphoric acid a heavy surface growth of both molds and oxidative yeasts developed. AS

2057 Muraleedharan (V), Unnithan (GR), George Joseph (K) and Unnikrishnan Nair (TS). Quality of cured fish on the West Coast-Comparative study with the IS specifications. Fishery Technology 26(1); 1989; 30-32

Moisture and salt contents in cured fish (Sardine, White bait, Silver belly, Sole, Lactarius and Mackerel) products from Calicut (Kerala), Karwar and Mangalore (Karnataka) and Goa coasts were analysed. Greater variations were observed in moisture content (25.47 to 53.67%) of fish collected from different centres, whereas salt content (17.37 to 23.77%) remained nearly uniform. The high mean moisture content and low salt content compared to accepted standards are indicative of the improper drying and poor salting. KAR

2058 Sano (T), Noguchi (SF), Tsuchiya (T) and Matsumoto (JJ). Contribution of tropomyosin to fish muscle gel characteristics. Journal of Food Science 54(2); 1989; 258-264

To determine the contribution of tropomyosin to fish muscle gel characteristics, the gel properties of the tropomyosin-desensitized actomyosin system and of the tropomyosin-mysoin system were investigated. For both system, the indices of gel properties decreased considerably on increasing the tropomyosin content. Even when the two-step heating was carried out, the indices of gel properties decreased considerably on increasing the tropomyosin content. Tropomyosin negatively affected the gel formation of fish muscle and reduced the gel strength and elasticity of the fish muscle gels. AS

2059 Vishwanath (W) and ChSarojnalini). Nutritive value of some fishes endemic in Manipur. Indian Journal of Fisheries 35(2); 1988; 115-117

Nutritive value of Botia hymenophysa, Lepidocephalus irrorata, Monopterus albus and Osteobrama belangeri, fishes endemic in the water bodies of Manipur (India) has been studied. Out of the four, total protein and lipid contents were highest in O. belangeri (21.31% and

9.5%); pure protein and ash contents were highest in B. hymenophysa (17.38 and 2.5%); Ca was max. in **M. albus** (108.00 mg/100 g) and Fe, in **L. irrorata** (26.01 mg/100g). Digestibility test (in vitro) showed that pepsin digested 62.83% protein of **O. belangeri** and pepsin + trypsin digested 89.66% protein of **L. irrorata**. The enzyme digests of **O. belangeri** and **M. albus** contained 6 essential amino acids each. AS

Catfish

2060 Przybylski (LA), Finerty (MW), Grodner (RM) and Gerdes (DL). Extension of shelf-life of iced fresh channel catfish fillets using modified atmospheric packaging and low dose irradiation. **Journal of Food Science** 54(2); 1989; 269-273

Fresh iced catfish fillets, processed with low dose irradiation (50-100 Krad) in combination with modified atm. packaging were sampled every 10 days during a 30-day storage period and analyzed for microbial load, colour (Hunter Colour Difference Meter), and 2-thiobarbituric acid values (TBA) as indices of change in quality. No difference ($P < 0.05$) was observed between microbial counts of packages flushed with elevated carbon dioxide atm. (80:20) carbon dioxide/air, (100% carbon dioxide) and controls flushed with 100% air. Therefore, irradiation treatments with or without elevated carbon dioxide-modified atm. packaging significantly reduced the bacterial load and extended shelf-life from 5 to 7 days to between 20 and 30 days. AS

Milkfish

2061 Chen (C-S), Tsao (C-Y) and Jiang (S-T). Purification and characterization of proteases from the viscera of milkfish (Chanos chanos). **Journal of Food Biochemistry** 12(4); 1989; 269-288

Proteases in acetone powder prepared from milkfish (**Chanos chanos**) viscera were extracted with deionized water and purified by ammonium sulphate fractionation, Sephadex G-75 gel filtration, repeated DEAE-Sephadex A-50 and CM-Sepharose CL-6B chromatography. Four fractions with caseinolytic activity, named A, B, C, and D, were obtained from CM-Sepharose LC-6B and DEAE-Sephadex A-50 chromatography. The four proteases were purified to electrophoretic homogeneity. Substrate specificity studies indicated that protease A and B were carboxypeptidase A-like and chymotrypsin-like enzymes, resp.; C and D were trypsin-like enzymes. The optimal temp. of proteases A, B, C and D for hydrolysis of casein were found to be 60, 60, 55 and 60 C, resp. The optimal pH of protease A for hydrolysis of hippuryl-L-phenylalanine was 9.0, B for hydrolysis of acetyl-L-tyrosine ethyl ester was 8.0, C and D for hydrolysis of tosyl-L-arginine methyl ester was 8.0. The temp. which inactivated 50% of enzymes in 5 min were 20 C for protease B; 50 C for protease C; 56 C for protease A; and 61 C for protease D. The mol. wt. of proteases A, B, C, and D were 14,800, 16,800, 24,800 and 22,000 daltons, resp. AS

Sardines

2062 Ammu (K) and Devadasan (K). Effect of preprocessing storage conditions on the carbonyls of oil sardine. **Fishery Technology** 26(1); 1989; 43-46

Changes in the total as well as major individual carbonyls of oil sardine muscle during storage at room temp. for 24 h and in crushed ice upto 6 days are reported. Carbonyls extracted with hexane were converted to their 2:4 dinitrophenyl hydrazone (DNPH) derivatives and were separated into major classes by column chromatography on celite/magnesia. Individual carbonyls were then identified by capillary gas chromatography of these derivatives. Though absolute values for carbonyls exhibited wide variations depending upon the degree of freshness, the pattern of changes in the carbonyls during storage of fish under different conditions gave an insight into the influence of carbonyls on flavour. The significance of the findings is discussed. KAR

2063 Ammu (K) and Devadasan (K). Effect of cooking and drying on carbonyls of oil sardine. **Fishery Technology** 26(1); 1988; 47-50

Changes in the total as well as major individual carbonyls of oil sardine (**Sardinella longiceps**) during steam cooking, oven drying (80-85 C to 4% moisture), sun-drying and freeze drying (to 2% moisture) are given. Carbonyls extracted with hexane were converted to their 2:4 dinitrophenyl hydrazone (DNPH) derivatives and were separated into major classes by column chromatography on celite/magnesia. Individual carbonyls were then identified by capillary gas chromatography of the DNPH derivatives. The total carbonyl increase was 89% in air oven dried sardine, 344% in sun-dried sardine, and 558% in freeze dried sardine. Drying invariably resulted in browning but its extent varied with the drying conditions. KAR

2064 Fujimoto (K), Endo (Y), Cho (S-Y), Watabe (R), Suzuki (Y), Konno (M), Shoji (K), Arai (K) and Saito (S). Chemical characterization of sardine meat powder produced by dehydration with high osmotic pressure resin and defatting with high pressure carbon dioxide. **Journal of Food Science** 54(2); 1989; 265-268

Oils and fishy odour were extracted from the minced sardine meat with liquid carbon dioxide after dehydration with high osmotic pressure resin. This treatment resulted in higher quality minced sardine meat usable as "Surimi". The lipids of the minced sardine meat defatted with liquid carbon dioxide was half that of undefatted meats; residual lipids were mainly composed of polar lipids such as phospholipids. Although soluble N and ATPase activity in sardine meat were decreased by dehydration and defatting, the **Kamaboko** forming ability was present, and its flavour was improved after defatting. Moreover, sardine meat defatted with liquid carbon dioxide had good stability against protein deterioration and lipid peroxidation. AS

Whitings

2065 Pacheco-Aguilar (R), Crawford (DL) and Lampila (LE). Procedures for the efficient washing of minced whiting (**Merluccius productus**) flesh for surimi production. **Journal of Food Science** 54(2); 1989; 248-252

Low vol. exchanges of water and washing at pH 4.9-6.7 was evaluated as means of reducing the water used for surimi processing. A single washing at a 3:1 water-flesh ratio and washing under acidic conditions at pH 5.0-5.3 were determined to be the most efficient procedures. Acidic conditions were the most effective in removing lipid and trimethylamine oxide. Water requirements were reduced by 80%, and yield was improved by up to 34% over conventional processing. Texture of gels was poorer when prepared from surimi produced under acidic conditions. Results suggested that reduced amounts of water might be possible in surimi processing and that Pacific whiting was a suitable resource for surimi production. AS

Products

Surimi

2066 An (H), Wei (CI), Zhao (J), Marshall (MR) and Lee (CM). Electrophoretic identification of fish species used in surimi products. **Journal of Food Science** 54(2); 1989; 253-257

Both sodium dodecyl sulphate polyacrylamide gel electrophoresis (SDS-PAGE) and urea gel isoelectric focusing (IEF) were used to identify sp.-specific protein bands of raw and cooked fish and surimi samples from Alaska pollock (**Theragra chalcogramma**) and red hake (**Urophycis chuss**). In raw samples, sp.-specific bands were found in the water extracts, while in cooked samples 1% SDS and 8M urea extracts were more effective for sp. identification in both fish and surimi. AS

PROTEIN FOODS

Infant foods

2067 Chandrasekhara (HN) and Prasanappa (G). Supplementary foods for preschool children-carbohydrate absorption. **Indian Journal of Nutrition and Dietetics** 26(1); 1989; 12-14

Two blends based on ragi (finger millet), jowar, wheat, and Bengalgram along with jaggery, hydrogenated fat, fortified with minerals and vitamins with a pleasant taste and flavour, was studied for the in vivo digestibility of the carbohydrate fraction. Carbohydrate digestibility was determined by feeding rats for 3 wk. The apparent absorption of carbohydrates from the two blends was 87.93 and 84.31%. Corn showed a digestibility of 94.28. On roasting the digestibility of jowar decreased by 5% whereas that of ragi did not show any change in digestibility on roasting. KAR

Weaning foods

2068 Malleshi (NG), Balasubrahmanyam (N), Indiramma (AR), Baldev Raj Desikachar (HSR). Packaging and storage studies on malted ragi and green gram based weaning food. **Journal of Food Science and Technology, India** 26(2); 1989; 68-71

The shelf life studies on a low dietary bulk weaning food based on malted ragi and green gram were conducted. The moisture humidity relationship studies at 27 C revealed that moisture content of 11% and equilibrium relative humidity of 65% were critical with respect to free flowing characteristics of the product. The product packed in flexible pouches and stored at accelerated (38 C and 92% RH) and Indian Standard (27 C and 65% RH) storage conditions exhibited increase in moisture content, free fatty acids, cooked paste viscosity and decrease in alpha-amylase activity progressively on storage. The shelf-life of the product packed in low density polyethylene pouches was about 2 months and 3 months under accelerated and ambient storage conditions whereas in laminate pouches, the shelf-life was about 3 months and 5 months in the corresponding storage conditions resp. AS

2069 Shah (PR) and Patel (HH). Bacteriological studies on weaning foods in relation to acute diarrhoea in children. **Indian Journal of Microbiology** 29(2); 1989; 165-167

A total of 150 food items comprising of Dal (split legume) (41), Dal + rice (39), rice (23), roti (unleavened pan cake) (16), milk (19), vegetables (8), biscuits (4), sweets (3), bread (3), sago (2) and barley water (1) collected from families in which acute diarrhoea in children was prevalent were examined for microbial counts. Aerobic counts ranged from 2.5 x 10^5 to 3.7 x 10^9 mg of food. Coliform count ranged from 300 to 2.4 x 10^4 mg or per ml of food. Escherichia coli, Klebisella pneumoniae, Pseudomonas aeruginosa, Citrobacter spp. Salmonella spp. Vibrio Cholerae were also isolated from the samples. E. coli was observed in all foods except vegetables, sago and barley water but the latter two did not contain amd enteropathogens. KAR

ALCOHOLIC AND NON-ALCOHOLIC BEVERAGES

Alcoholic beverages

2070 Maga (JA). The contribution of wood to the flavour of alcoholic beverages. **Food Reviews International** 5(1); 1989; 39-99

Role of wood in contributing flavour to alcoholic beverages is reviewed. Aspects covered in this review include wood comp. in general, the various types of wood used in aging alcoholic products, oak comp. and flavour properties; cork comp. and its desirable and undesirable flavours, the effect of wood on wine flavour, the effect of wood on distilled spirit flavour, and the practice of accelerated wood aging of alcoholic beverages. 285 references. BV

Wines

2071 El Haloui (N), Picque (D) and Corrieu (G). Alcoholic fermentation in wine making. On line measurement of density and carbon dioxide evolution. **Journal of Food Engineering** 8(1); 1988; 17-30

Linear correlations on the lab. scale (15 litres) have been made between the concn. of ethanol and sugars, and the vol. of carbon dioxide released and the density of the fermentation medium. The on-line measurement of these variables in a 700-l winemaking tank by corresponding sensors (flow meter and pressure transducers) and application of resulting correlations have led to the real-time detn. of the concn. of ethanol and sugars. The proposed methods were validated by off-line measurements. The method using the vol. of carbon dioxide released is easier to use. It is an accurate means for following alcoholic fermentation in winemaking. AS

Non-alcoholic beverages

Coffee

2072 Jackson (LS) and Lee (K). Chemical forms of iron, calcium, magnesium and zinc in coffee and rat diets containing coffee. **Journal of Food Protection** 51(11); 1938; 883-886

Chemical forms of Fe, Ca, Mg and Zn (mineral profiles) were measured in brews of regular and decaffeinated instant coffee and diets containing these coffees. Fe, Ca and Mg were highly soluble (90-98%) in brews of both coffees and Zn could not be detected. All ionic Fe was in the ferric state and 40-43% of total Fe was in soluble complexes. Iron was less soluble in a rat diet containing regular instant coffee (57%) and a diet containing decaffeinated coffee (62%) than in a control diet (74%). Diets had the same amounts of ferric and ionic Fe (43-45%). More Fe was in soluble complexes in control (29%) and decaffeinated coffee (21%) diets than a regular coffee diet (12%). Calcium had low solubility (12-14%) while Mg had high solubility in diets. Zn was more soluble in both coffee diets than in the control. Some mineral profiles of coffee alone. Differences indicated that mixing coffee into diets induced changes in coffee. Mineral profiles of diets predicted some results of a rat bioavailability assay. AS

Coffee

2073 Scott (NR), Chakraborty (J) and Marks (V). Caffeine consumption in the United Kingdom. A retrospective survey. **Food Sciences and Nutrition** 42F(3); 1989; 183-191

In this paper the values determined by HPLC for methyl xanthine content of common U.K. beverages have been presented. These values are found to be for a standard cupful (mg/200) were for instant coffee-64.2; tea-55.2; percolated/filter coffee-133.0; cola-flavoured drinks-13.7 and chocolate drinks -13.7. These compared with values reported in literature. The obromine accounted for more than 97% in chocolate drinks (69.9 mg/200 ml) with trace amounts of the ophylline. The mean daily caffeine intake for a U.K. population was found to be 359 mg and the daily caffeine intake of smokers was significantly higher than that of non-smokers. The age has no relation to the daily intake of caffeine. NGKR

Fruit juices

2074 Shaw (PW) and Wilson III (CW). Sensory evaluation of passion fruit-orange juice blends. **Lebensmittel-Wissenschaft und-Technologie** 21(6); 1988; 358-359

The flavour threshold of passion fruit juice added to orange juice was determined using an experienced flavour panel. Several orange juice-passion fruit juice blends and one commercially available orange-passion fruit drink blend were evaluated hedonically as well. AS

Apple juices

2075 Bandoni (JA), Rotstein (E) and Romagnoli (JA). Simulation modelling and optimal operation of an apple juice concentrate plant. **Journal of Food Engineering** 7(3); 1988; 159-175

2076 Barefoot (SF), Tai (HY), Brandon (SC) and Thomas (RL). Production of microbiologically stable apple juice by metallic membrane ultrafiltration. **Journal of Food Science** 54(2); 1989; 408-411

The potential for production of microbiologically stable apple juice by metallic membrane ultrafiltration was assessed. Thermal sterilization treatments caused no detectable changes in membrane performance. Sterile membranes were challenged with approx. 3 x 10 CFU/g of each of three organisms, **Pseudomonas diminuta**, **Bacillus coagulans**, and **Saccharomyces cerevisiae**, suspended in apple puree or peptone. Reductions achieved by ultrafiltration of peptone at operating pressure were 5.1, 7.6, and > 9.0 logs for the three organisms, resp. Reduction or organisms in apple puree were at least 1.5 logs greater. Metallic membranes eliminated yeasts and molds from juice. Apple juice produced from uninoculated apple puree was stable at 20-25 C for 1 yr. AS

2077 Soto-Peralta (NV), Muller (H) and Knorr (D). Effects of chitosan treatments on the clarity and colour of apple juice. **Journal of Food Science** 54(2); 1989; 495-496

Acid-soluble and water-soluble chitosans as fining agents for apple juice were compared to conventional silica sol/gelatin/bentonite treatment. Both chitosans proved equally effective in reducing juice turbidity as compared to control treatments and slightly lighter juices resulted from chitosan treatments. Use of the one step chitosan treatment appears as an alternative to conventional fining processes. AS

Apples juices

2078 Kim (KH), MeyssaMi (B) and Wiley (RC). Pectinase recovery from ultrafiltered apple juice. **Journal of Food Science** 54(2); 1989; 412-415

A plate and frame ultrafiltration (UF) unit was used to study the influence of processing conditions on recovery of pectinase from commercially pressed apple juice containing about 0.113% polygalacturonic acid. Polygalacturonase (PG) from commercial pectinases was the primary enzyme studied and evaluated in retentate during and after UF. UF time and temp. have a significant effect on PG activity in retentate, while pressure, pump flow rate are 20,000 and 50,000 dalton mol. wt. cut-off (MWCO) membranes were relatively unimportant. Higher temp. (50 C) UF operations yielded more active PG. Process times of 3, 30 and 50 min at optimum conditions yielded retentates with 94.1, 62.8, and 54.1%, resp., of the PG activity in the feed juice. AS

FATS AND OILS

Oils

Mustard oils

2079 Kumar (KR), Nagappan (A) and Baldev Raj). Evaluation of flexible packages to contain mustard oil. **Journal of Food Science and Technology, India** 26(2); 1989; 59-63

Packaging and storage studies have been carried out on mustard oil packed in pouches of low-density polyethylene, Nylon-6 (PA)/Ionomer, polyester ((PET)/high density-low density polyethylene and metallized polyester/HD-LDPE and stored at accelerated (38 C and 92% RH) and normal (27 C and 65% RH) conditions. The shelf life of oil was found to be 20 days in LDPE, 60 days in Polyamide/Ionomer, 120 days in PET/HD-LDPE and more than 120 days in Met. PET/HD-LDPE pouches under the accelerated condition, and at the normal condition, the corresponding shelf-lifes were found to be 30 days in LDPE, 60 days in PA/Ionomer and more than 120 days in polyester based materials. AS

Palm oils

2080 Kim (SH). Aqueous extraction of oil from palm kernel. **Journal of Food Science** 54(2); 1989; 491-492

Aqueous extraction of oil from palm kernel was investigated on a lab. scale, varying several processing parameters, with main emphasis on their effects upon oil yield. Oil was obtained as a clear, yellowish, separate phase. Max. oil yield was obtained at 20 min of grinding with a Waring Blendor, extraction temp. 45 C, grinding temp. 60 C and pH 7.0. Increasing the grinding time and extraction temp. did not improve the oil yield. On either side of pH 7.0 not only was the oil yield decreased but an emulsion tended to form. The dilution ratio had no effect on the oil yield. Oil yield was increased further by re-extraction. AS

Rice bran oils

2081 Kumar (S), Bhole (NG) and Mukherjee (RK). Study of rice bran oil industry in India in the light of empirical evidence. **Indian Food Industry** 8(1); 1989; 20-24

A survey to identify the reasons for the gap between potential and actual production of edible grade rice bran oil. Suggestion is made to increase the production of edible grade rice bran oil. BV

SPICES AND CONDIMENTS

Spices

2082 Sharma (A), Padwal-Desai (SR) and Nair (PM). Assessment of microbiological quality of some gamma irradiated Indian spices. **Journal of Food Science** 54(2); 1989; 489-490

Irradiated (10KGY) and unirradiated pre-packed whole and ground spices including black pepper, red chilli, and turmeric were examined by 6 different lab. for microbiological quality. No colony forming units (CFU) were reported in the largest quantity of irradiated spices used in the study by 3 out of six lab. The other 3 lab. reported counts ranging between 0-90 CFU/g in irradiated samples. None of the 6 lab. reported the presence of **E. coli** or **B. cereus** in the spices exposed to gamma irradiation. These data suggest that a standard plate count of 0-100 CFU/g and a count of zero CFU/g for **E. coli** and **B. cereus** be fixed for spices exposed to a 10 KGY dose of gamma rays. AS

Garlic

2083 Solomon (HM) and Kautter (DA). Outgrowth and toxin production by **Clostridium botulinum** is bottled chopped garlic. **Journal of Food Protection** 51(11); 1988; 862-865

The ability of **Clostridium botulinum** types A and B spores to grow and produce toxin in commercially bottled chopped garlic in soybean oil was investigated. Eight type A and seven type B strains of **C. botulinum**, mostly of vegetable origin, were used as inocula. Various numbers of spores were inoculated directly into the jars containing garlic, incubated at 35 C and samples for organoleptic acceptance and presence of toxin every 5th d. In parallel studies conducted at room temp., jars were sampled at 15-d intervals. At 35 C, when 1 spore/g of garlic was used as inoculum, toxin was produced in 15 d by type A and in 20 d by type B strains. At room temp., five spores of type A and B per g of garlic produced toxin throughout 75 d. Even when highly toxic, garlic looked and smelled acceptable. Five strains of C. botulinum type A were isolated from 115 bulbs of fresh garlic. AS

Ginger

2084 Pachori (SB), Maheshwari (AK) and Pachori (RM). Effect of feeding Zingiber officinale (Ginger) on serum and urinary sodium levels in albino rats. Indian Journal of Nutrition and Dietetics 26(1); 1989; 15-17

Supplementation of extract of ginger (Zingiber officinale) to the normal albino rats showed a consistent significant fall in serum Na levels and a consistant significant increase in urinary Na levels as compared to the control group. KAR

Turmeric

2085 Manjunath (MN), Sattigeri (VD) and Nagaraja (KV). Curcumin in turmeric. Indian Spices 25/26(4/1); 1988; 9-12

Brief description of the properties, tests, estimation method and uses of curcumin; specification for turmeric as prescribed by Indian Standards Institution, Prevention of Food Adulteration Act and AGMARK of India are given. Data of Federal Specification, curcumin content of turmeric samples collected from different regions of the country, and curcumin content in adulterated turmeric powder have been tabulated. KAR

SENSORY EVALUATION

2086 Kokini (JL) and Fischbach (ER). Storage stability of model sucrose or salt added o/w emulsions through steady shear and creep rheological measurements. Journal of Food Processing and Preservation 12(4); 1989; 293-308

2087 Rao (VNM), Webb (KS) and Powers (JJ). Correlation coefficient and confidence interval estimation between sensory and objective measurements under destructive testing using computer simulation. Journal of Food Processing and Preservation 12(4); 1989; 327-334

Estimation of correlation between sensory and instrumental data for food products is used in research and industrial applications. Often the measurement techniques destroy the sample making it impossible to collect more data on the same time. This results in a correlation based not on individual observations but rather on the average of the data, leading to an erroneous and artificially high correlation. A method using max. likelihood techniques and conditional simulation is proposed for estimating the correlation in this case. AS

FOOD STORAGE

2088 Dunkel (FV). The relationship of insects to the deterioration of stored grain by fungi. **International Journal of Food Microbiology** 7(3); 1988; 227-244

The data presented tests the hypothesis that knowledge of basic biological relationships between insects and fungi in the stored grain ecosystem can open new paths for management of the system. Evidence indicates: (1) some storage insect sp. are disseminators of storage fungi and some are exterminators; (2) some storage fungi attract storage insects and promote their population increases and other repel and secrete toxin harmful to insects; (3) certain morphophysiologic, biochemical similarities of fungi and the early developmental stages of insects suggest that new protective chemicals, insecticidal fungicides, could be designed or specifically sought. A specific examples of a naturally occurring compound with dual action, sorbic acid (2,4-hexadienoic acid), is given and its effect on both insects and fungi is discussed. Sorbic acid is the only compound in the U.S presently labelled by the FDA (Food and Drug Administration) as GRAS (Generally Regarded as Safe) and registered by the EPA (Environmental Protection Agency) for use on grain (maize) in storage. AS

2089 Magan (N) and Lacey (J). Ecological determinants of mould growth in stored grain. **International Journal of Food Microbiology** 7(3); 1988; 245-256

Grain entering store carries a microflora of 'field' and 'storage' fungi. Field fungi require readily available water and therfore seldom develop in store. By contrast, storage fungi, especially **Aspergillus** spp., are able to grow at low water activities (0.70-0.75) enabling them to initiate grain spoilage. The ability of storage fungi to germinate, grow and sporulate in stored grain is dependent on the availability of water in the substrate, temp. and the intergranular gas comp. These factors may interact to have a profound influence on the initiation of spoilage of stored grain by fungi. An understanding of the ecological determinants of mould growth may help to develop improved and safer methods of grain storage. AS

2090 Wells (JH) and Paul Singh (H). A quality-based inventory issue policy for perishable foods. **Journal of Food Processing and Preservation** 12(4); 1989; 271-292

Inventory issue policies that are based on elapsed storage time do not account for nonuniform deterioration within a perishable inventory stockpile. The literature on keeping quality of perishable food provides ample evidence of the direct relationship between storage temp. and quality deterioration. Because varying temp. condition may be encountered during storage and distribution of perishable foods, each item in an inventory stockpile may have a different deterioration history. The time-based first-in-first out (FIFO) and last in firs out (LIFO) issue policies, in additional, to a quality-based issue criterion, the shortest remaining shelf-life (SRSL) issue policy were examined with a computer simulation of frozen broccoli stored in temp. varying conditions. The SRSL issue policy showed advantages over both the FIFO and LIFO policies in that items issued under the SRSL policy were of equal or higher average quality, with less quality variation at time of issue. The use of the SRSL issue policy in conjunction with full-history time-temp. indicators to predict temp. dependent changes in food quality is discussed. AS

INFESTATION CONTROL AND PESTICIDES

Nil

BIOCHEMISTRY AND NUTRITION

2091 Johnson (IT), Gee (JM) and Brown (JC). A comparison of rice bran, wheat bran and cellulose as sources of dietary fibre in the rat. **Food Sciences and Nutrition 42F(3); 1989; 153-163**

Rats were fed semi-synthetic diets containing cellulose, wheat bran or rice bran, or a control diet free of non-starch polysaccharides (NSP). Food intake, wt.-gain and faecal output were monitored over a period of 4 wks, after which the animals were killed and tissue and samples collected to assess gastrointestinal growth. Blood samples were also collected for measurement of circulating glucagon-like immunoreactivity (GLI) and serum-cholesterol. The dry mass of faeces produced by the rats fed rice bran and wheat bran was greater than that of the control-fed animals, and was proportional to their NSP intake. Rats fed wheat bran produced faeces with a slightly higher moisture content than those fed cellulose. There were no major differences in gastrointestinal morphology between the groups, but the animals given cellulose had slightly lower caecal tissue wt. and plasma GLI levels than the other groups. Neither cereal bran led to significantly lower plasma cholesterol levels compared to the fibre-free control. It is concluded that rice bran has similar physiological characteristics to wheat bran when given as a dietary constituent and is therefore a potentially useful alternative as a source of fibre in human diets. AS

Biochemistry

2092 Gee (JM), Bhabuta (A) and Johnson (IT). A technique for assessing the biological availability of folate in foods. **Food Chemistry 31(2); 1989; 149-158**

A method is described for the assessment of folate availability from human foods using the folate-depleted rat. Animals were maintained on a semisynthetic diet for period of 4 wks or more. At the end of this period tissue folate levels were measured using a radioimmunoassay. Folate intakes were assessed by monitoring food intake on a daily basis. The folate content of the diet was determined by microbiological assay. The animals continued to grow and maintain health throughout the depletion period, but levels of folate in liver, serum and intestinal mucosa were significantly reduced in comparison to rats fed a folate supplemented diet. Refeeding depleted rats with crystalline folic acid, or with freeze-dried cabbage incorporated into the semi-synthetic diet led to a measurable increase in tissue folate stores within 24 h. The serum-folate level appeared to be the most consistent and conveniently measurable index of folate status. The method provides a relatively inexpensive and rapid method of measuring the physiological response to the most important sources of folate in the human diet. AS

2093 McBurney (MI) and Thompson (LU). In vitro fermentabilities of purified fiber supplements. **Journal of Food Science 54(2); 1989; 347-350**

Six commonly used dietary fiber supplements (pectin, tragacanth gum, Psyllium gum, guar gum, soy fiber and cellulose) were fermented in vitro with human fecal microbiota for 4, 8, 12 and 24 hr. Short chain fatty acids (SCFA), hydrogen and methane productions, and neutral detergent fiber digestibility differed significantly with fiber source. The most rapid fermentation rate was with pectin followed by Psyllium gum, tragacanth gum, guar gum, soy fiber, and finally cellulose. Such differences in fermentability should be considered when food products are formulated. Dietary fiber source and intake may also affected breath hydrogen measurements and estimates of available carbohydrate malabsorption. AS

Nutrition

2094 Gerster (H). Vitamin losses with microwave cooking. **Food Sciences and Nutrition 42F(3); 1989; 173-181**

This review discusses vitamin losses with microwave cooking as it is a popular appliance in modern kitchens. This covers the effect of microwaves on vitamins, during blanching, thawing, cooking of vegetables, cooking of meat, baking, and reheating of food. NGKR

TOXICOLOGY

Mycotoxins

Aflatoxins

2095 Sashidhar (RB), Bhat (RV) and Vasanthi (S). Rapid detection of aflatoxin by pressure mini-column technique. A collaborative trial. **Current Science 58(15); 1989; 882-885**

The methods currently available for aflatoxin detection require sophisticated equipment and elaborate sample clean-up and are not useful for routine screening and detection. The commonly used mini-column chromatography has been modified and a simple, rapid and reliable method has been developed to detect aflatoxin in food and feed. Application of positive pressure helps in better aflatoxin separation. A collaborative exp. done with 10 lab. to find out the variation in results of contaminated maize indicated aflatoxin content of 60-120 ng/g of maize; by HPLC the same maize showed aflatoxin of 92 ng/g of maize. KAR

2096 Williams (KR) and Dutton (MF). Destruction of aflatoxin during the production of hydrolysed vegetable protein. **Journal of Food Protection** 51(11); 1988; 887-891

An investigation into the breakdown of aflatoxins during the hydrolysis of artificially contaminated vegetable protein was conducted using a lab scale reactor. The conditions were selected to emulate a commercial process used to produce a protein hydrolysate used in processed food and soup ingredients. Chromatographic analysis showed that aflatoxin at relatively high concn. are totally destroyed and removed from the product. Residues from extracts were free of mutagenic properties, as monitored by the Ames test. AS

FOOD LAWS AND REGULATIONS

Nil

READY FOR RELEASE ....

"Directory of Indian Processed Food and Allied Industries"

Listing over 4000 major food processors/exporters and their products manufactured in the area of fruits, vegetables, cereals, dairy, fish, meat, poultry, oilseeds, nuts food additives, packaging, etc.etc.

Plus

Information on Food Laws and Regulations, financing, licensing and quality control agencies, training organizations, R&D agencies.

and

an Index of range of products, flavours and additives available in the country.

An invaluable guide to one and all in the area of *food processing*

Price: Rs.500/- (Packing & Fowarding charges extra Rs.25/-)

D.D./Cheque/M.O. to be drawn in favour of Director, CFTRI, Mysore. Please add Rs.10/- towards bank collection charges for outstation cheques.

For copies, write to:

The Sales and Distribution Officer, FOSTIS,
CFTRI, Mysore - 570013.

GENERAL

2097 Dwivedi (BK). Special dietary foods. **Food Reviews International** 2(2); 1986; 171-212

Dietary foods that meet the special nutritional needs of people suffering from abnormal physiological conditions, such as deficiency states and metabolic disorders, are reviewed. The following aspects are covered nutrition and health, special dietary use-definition, low-sodium foods, low-gluten foods, foods low in phenylalanine, low-calorie foods, high-calorie foods, low-fat foods, modified carbohydrates foods, low-protein foods and high protein foods. 48 references. BV

2098 Firmin (A). Simple methods for evaluating **attieke** spoilage. **Food Chemistry** 31(4); 1989; 313-317

Optical density, viable count and pH changes during **attieke** storage suggested that **attieke** spoilage was highly related with microbial growth. These simple tests, which were associated with flavour alterations, could be evaluated by sensory analysis of **attieke** and might serve as prime criteria of **attieke** spoilage. AS

2099 Jackman (RL), Yada (RY), Marangoni (A), Parkin (KL) and Stanley (DW). Chilling injury. A review of quality aspects. **Journal of Food Quality** 11(4); 1989; 253-278

A number of different methods are available by which to alleviate symptom development, including manipulation of storage conditions (e.g., temp. cycling, hypobaric and modified atm. storage), exogenous chemical treatments (e.g., application of phospholipids, antioxidants, Ca) and genetic modification of chill sensitive species are discussed with respect to their effectiveness and possible control mechanisms. 125 references. BV

FOOD PROCESSING

2100 Burfoot (D), Griffin (WJ) and James (SJ). Microwave pasteurisation of prepared meals. **Journal of Food Engineering** 8(3); 1988; 145-156

Pasteurising ready-to-eat meals in their retail packaging extends their shelf life. Temp. above 80- C are required to pasteurise a wide var. of products. The ability of microwave systems to produce these temp. in packs of spaghetti, bolognaise, without reducing product quality, was investigated using a domestic microwave oven (2450 MHz; multi-mode; 0.2, 0.36 or 0.6 kW; 240 or 300 S residence time), a pilot-scale tunnel (2450 MHz; multi-mode; 6 kW?, 125 or 158 s residence time) a pilot-scale tunnel (2450 MHz; mode; 6KW, 125 or 1588 residence time) and a further pilot-scale tunnel (896 MHz; single-mode; 7 kW, 144 s residence time). Product temp. distribution after microwave heating was measured using nine thin wooden rods with two thermocouples attached to each. The probes were inserted near the four corners of the product, at the centre and mid-way along each edge. Mean product temp. above 80 C could be achieved using any of the systems but only the tunnel operating at 896 MHz heated all of the product in a pack above that temp. The multi-mode systems produced the least uniform heating, the coldest regions being located at the centre and the hottest at the corners of products. Temp. differences measured within individual products after heating in the domestic oven and the 2450 MHz tunnel were up to 66 C and 36 C, resp. In the 896 MHz tunnel temp. at the corners were lower than at the edges and mean temp. of 90 C were achieved with standard deviations (six replicates) of < 6 C and a max. temp. difference of 17 C within a single product. AS

2101 Govaris (AK) and Scholefield (J). Comparison of a computer evaluation with a standard evaluation of retort pouch thermal processing International Journal of Food Science and Technology 23(6); 1988; 601-606

Flexible retort pouches (188 x 127 x 25.4 mm) filled with 10% bentonite suspension, tomato ketchup and potato puree were processed under computer control using steam air or hot water, and the heating/cooling curves and thermal diffusivities were determined. A computer method, developed for the evaluation of the thermal process using the one-dimensional heat conduction equation, was used to calculate F_o values which were then compared with those obtained using the General-and the Stumbo s Formula methods. Temp. at the pouch centre estimated by the Formula-and the Computer method were in good agreement with those obtained experimentally. The F_o values estimated by the computer method were closer to the F values estimated by the General method than those obtained by the Formula method. AS

FOOD PACKAGING

2102 Hernandez Mendez (J), Jimenez de Blas (O), del Valle Gonzalez (A) and Alonso Gutierrez (D). Correlation between lead content in human biological fluids and the use of vitrified earthernware containers for foods and beverages. Food Chemistry 31(3); 1989; 205-213

Packaging

2103 Kim (H) and Gilbert (SG). Isolation and identification of volatile compounds from glassine packages. Journal of Food Science 54(3); 1989; 770-771, 773

The volatile flavour compounds in glassine packages were characterized using headspace concn. technique and GC/MS. The major compounds identified were 2,2-dimethyl-1,3-propanediol, 3,3-dimethyl-

4-hydroxybutanal, and 2,2-dimethyl-1,3-propanediol diacetate. Compounds representing hydrocarbons, alcohols, and phthalates were also identified. The majority of these compounds could be attributed to residues from the lacquer applied to the glassine paper as a curable coating. AS

FOOD ENGINEERING AND EQUIPMENT

Engineering

2104 McCarthy (KL) and Merson (RL). An integral method analysis of steam infusion heating of a free falling film. Journal of Food Science 54(3); 1989; 734-737, 747

An analytical and experimental study of direct contact condensation to a free falling film of liquid was modeled. The thermal energy equation governing the steady state heat transfer was solved by an integral technique. The predictive model for velocity and temp. profiles was verified experimentally. Water was used as the test fluid in a steam infusion unit at flow rates of 1.6-2.3 L/min The water fell in intact sheets 7.6 x 10 m wide and at an initial thickness of 8.9 x 10 m. Fluid velocity and average fluid temp. compared well with model predictions within the experimental range. AS

2105 Padmanabhan (M) and Bhattacharya (M). Analysis of pressure drop in extruder dies. Journal of Food Science 54(3); 1989; 709-713

Entrance pressure drop of extruder dies increased with a decrease in the ratio of barrel-to-die diameter during the extrusion of corn. For the low Reynolds number flow studied (1.77 x 10 less than or equal to Re less than or equal to 9 x 10) the viscous component, obtained from Weissberg's analysis, contributed 2% to 40% of the entrance pressure drop and increased as the barrel-to-die diameter ratio decreased. The friction factor for laminar fully developed flow through the die followed the expression f = 16/Re. Fully developed flow within the die was achieved at a die length-to-diameter ratio of 9. AS

2106 Ratti (C), Crapiste(GH) and Rotstein (E). A new water sorption equilibrium expression for solid foods based on thermodynamic considerations. Journal of Food Science 54(3); 1989; 738-742, 747

Solution thermodynamics was used to derive a new semitheoretical expression to represent sorptional equilibrium in food products having both temp. and water content as independent variables. A number of correlations have been studied and compared with the proposed equation using different requirements, necessary for their application in mathematical modeling and engineering calculations. These criteria were their capabilities to fit the experimental data, to evaluate the derivatives and the heat of sorption, and to predict the behaviour at high moistures. On this basis, it was concluded that the present expression provided an accurate description of the sorptional behaviour for many food systems. AS

2107 Townsend (MA) and Gupta (S). The roast. Nonlinear modeling and simulation. Journal of Food Process Engineering 11(1); 1989; 17-42

This paper reports results on the roasting meat which are compared with conventional recommendations and it is seen quite a variation is found for different roasts which are either long or flat. Evaluation was done due to effects of inital temp. after cooking and other parameters and optimum conditions are specificed for a specified roasting process profile. NGKR

ENERGY IN FOOD PROCESSING

Nil

FOOD CHEMISTRY AND ANALYSIS

Chemistry

2108 Dickinson (E), Murray (BS) and Stainsby (G). A rapid routine method for monitoring creaming behaviour in small samples of food emulsions. Food Science Technology 22(1); 1989; 25-28

A new method for the routine monitoring of creaming in non-dilute food emulsions is introduced. A video picture of the illuminated sample is captured using an image analyser, and the variation in transmitted light intensity as a function of height is determined. The intensity profile may be used directly as a sensitive indicator of the extent of creaming, or it may be converted to a vol. fraction profile by suitable calibration. To illustrate the use of the technique in emulsion formulation studies, report test data for creaming of two emulsions made with gum acacia samples from different sources. AS

Chemistry(Analytical)

2109 Mower (HF), Bhagavan (NV), Pontius (EB) and Mcdermott (JF). Tyramine content of Asian and Pacific foods determined by high performance liquid chromatography. Food Chemistry 31(4); 1989; 251-257

Tyramine was analyzed in selected Asian and Pacific foods utilizing high performance liquid chromatography. The method is rapid, sensitive and specific. It gave comparable results when food extracts were analyzed by the fluorescence procedure. Fermented salted black beans and shrimp sauce prepared in Hong Kong contained high levels of tyramine, and 18 other Asian and Pacific foods contained low to moderate amounts. Tyramine levels of some food items increased during refrigerated storage. AS

2110 Osborne (BG) and Tyson (JF). Flow injection analysis a new technique for food and beverage analysis. (Review) **International Journal of Food Science and Technology** 23(6); 1988; 541-554

This review outlines the principles, instrumentation and techniques of flow injection analysis and considers the scope of its actual and potential applications in food and beverage analysis. 49 references. BV

FOOD MICROBIOLOGY AND HYGIENE

Ethyl alcohol

2111 Yamade (K) and Fukushima (S) Continuous alcohol production from starchy materials with a novel immobilized cell/enzyme bioreactor **Journal of Fermentation Technology (Hokko Kogaku Zasshi')** 67(2); 1989; 97-101

In this paper rapid production of high concn. of alcohol from liquefied starch material through the parallel operation of saccharification and fermentation such as that used for making Japanses sake in a bioreactor packed with immobilized yeast cell and immobilized enzymes has been developed. In this system it was packed with both alginate biocatalyst A (entrapment of adsorbed-glucoamylase on Y-alumina) and biocatalyst B (entrapment of mixture of different strains of yeasts cells) 60-95 kg/M of alcohol solution were continuously produced through parallel operation of saccharifying and fermenting liquefied starchy materials of potato and grains without contamination. This continuous process has been performed at a pH of 2.8-3.2 and at a temp. of 30 C. NGKR

Fermentation

2112 Havlik (I) Yerushalmi (L) and Volesky (B). Computerised system for monitoring and control of fermentation processes. **Process Biochemistry** 24(1); 1989; 9-14

Amulti-purpose data acquisition system for the continuous on-line monitoring and processing of the fermentation data is described. The computerized systems has the ability to carry out data collection from a series of fermenters and store the data in a unified database system. It facilitates real-time data analysis and by means of process simulation, can support the operator-supervised optimization of fermentation conditions during the exp. Process instrumentation was developed in accordance with the requirements of a typical product-oriented fermentation process. The solvent-production multiple-product, anaerobic acetone-butanol fermentation process was adopted as a model process for this work. The instrumentation included **in situ** fermenter sensors for the pH temp. rev/min, and redox potential, custom-built devices for monitoring of the liquid phase vol. and the gas production vol. a digital-output equipment monitoring **in situ** the fermentation broth fluorescence (NADH), semi-automatic glucose analyser, and gas chromatographs analysiing off-line the components of the liquid broth and fermenter off-gases. Computer equipment, based on the IBM PC-compatible machines, included a master computer and three front-end computers equipped with analog I/O and serial communication facilities. Process software carries out the following functions: data aquisition from analog-output sensors and front-end computers; on-line data processing for the display and process analysis; simulation of the process concurrently with data acquisition; and feed pump rate control. AS

Fermented foods

2113 Tuncel (G), Nout (MJR) and Rombouts (FM). Effect of acidification on the microbiological composition and performance of **tempeh** starter. Food **Microbiology** 6(1); 1989; 37-43

Using rice and soybeans as raw materials, the effects of : (i) (fermentative) acidification of the substrate (ii) cross-contamination with acidifying microflora of the soaked substrate and (iii) the method of spore extraction were investigated. Microbiological analyses of fresh and stored starters, and of the resulting soybean **tempeh** were carried out. The acceptability of fresh **tempeh** was also evaluated. Rice-based starters yielded tempeh of higher acceptability but had a shorter shelflife (2.5 months) than soybean based starters (7 months). Fermentative acidifiation of raw materials resulted in starters with higher counts of fungal spores and lower counts of bacteria. Starters made with cross-contaminated raw materials resulted in **tempeh** of highest acceptability when fermentatively acidified soybeans were used for **tempeh** manufacture. Starter extraction by staining of fungal spores was compared with grinding the total mass of moulded substrate, and was considered inappropriate in view of its low yield compared to the grinding method It is concluded that fermentative acidification of raw materials prior to the manufacture of starters and **tempeh** contributes to their microbiological safety and acceptability. The latter can be increased by lactic acid bacteria which may be introduced by the starter or by cross-contamination with fermentatively acidified soaking water. AS

Tempeh

2114 Okada (N). Role of microorganisms in **tempeh** manufacture. Isolation of vitamin B 12 producing bacteria. **JARQ (Japan AgriculturalResearch Quarterly)** 22(4); 1989; 310-316

Discusses manufacture of **tempeh**, vitamin B 12 content of **tempeh** as compared with other fermented foods in the tropics, production mode of vitamin B 12 in **tempeh**, isolation and identification of vitamin B12 producing bacteria and prospects. BV

Microorganisms

Bacteria

2115 Adair (C), Kilsby (DC) and Whittall (PT). Comparison of the schoolfield (non-linear arrhenius) model and square root model for predicting bacterial growth in foods. Food Microbiology 6(1); 1989; 7-18

A comparative assessment of eight sets of data demonstrating the effect of temp. on the growth of bacteria in foods was made. For each set of data of Schoolfield model and Square Root model were constructed. Predictions from both models were compared with the original data to look at the `goodness of fit . In every case the Schoolfield model was found to be a more relaible description of the experimental data. The Square Root model was found to deviate significantly from the observed data at the lowest temp. in all but one case. It is therefore recommended that the Schoolfield model is used to produce predictive models from bacterial growth data. AS

2116 Hachigian (J). An experimental design for determination of D-values describing inactivation kinetics of bacterial spores. Design parameters selected using computer simulation. Journal of Food Science 54(3); 1989; 720-726

An improved experimental design is proposed for studies of bacterial extinction. The new design may be used for either inoculated pack or model system studies. The design uses variable spore loads, and judiciously spaced time points (or doses) with a variable number of replicates over a selected range. A computer simulation of the process simplifies parameter selection in an economic way. The improved design results in more useable data points over an increased range leading to more accurate estimates of the D-value with the same level of experimental effort used in current exp. AS

Pseudomonas fragi

2117 Myhara (RM) and Skura (BJ). Growth conditions affecting proteolytic enzyme and extracellular vesicle production by Pseudomonas fragi ATCC 4973. Journal of Food Science 54(3); 1989; 686-690, 694

Pseudomonas fragi ATCC 4973 was grown in liquid culture (trypticase soy broth) and on a solid surface (tryticase soy broth + 1.5% agar). Ps. fragi grown in liquid culture started extracellular proteolytic enzyme production at 24 h., during the late exponential early stationary growth phase. Ps. fragi, grown on solid surface, initiated proteinase production at 4 h, 20 h, earlier than in liquid medium. Proteinase production was greatest during periods when the cells were not actively growing. Electron micrographs of Ps. fragi grown on solid surfaces revealed extracellular vesicles ca. 20 nm in diameter "blebbing" off the surface of the cells. The greatest number of vesicles coincided with max. proteinase production. These vesicles were absent from the surface of Ps. fragi cells grown in liquid culture.

AS

Staphylococci

2118 Sokari (TG) and Anozie (SO). Modified single radial immunodiffusion method for screening staphylococcal isolates for enterotoxin. Food Microbiology 6(1); 1988; 45-48

Plate modification of single radial immunodiffusion technique was adopted from simultaneous screening of over 50 isolates of Staphylococcus aureus in an agar diffusion assay for enterotoxins (A-D). The enterotoxins were separated from the cells of Staph. aureus grown on celloplane overlaid on blood agar plates by suspending the growth in 0.3 ml saline and centrifuging at 5000 rpm/15 min. Wells of 6 mm dia were cut into the assay agar (10 ml per plate) which contained the following: purified agar (oxoid) in 0.18 M phosphate buffer pH 7.4, 0.1% merthiolate and antiserum (diluted 1:140 from Bergdolts preparation of 0.5 ng ml^{-1} for enterotoxin B). Wells (52 Nos with the help of a grid or cm graph paper) were loaded with the reference enterotoxins (0.5 μ g ml^{-1}) and culture supernatants. After incubation at 37 C overnight, the plate was floated with 0.1 M phosphoric acid for 20 min. The appearance of white precipitation ring confirmed the presence of enterotoxin specific to the antiserum in the agar. Economy of materials and saving of time in the assay is recommended by the authors. NK

Fungi

Yeasts

2119 Giec (A), Stasinska (B) and Skupin (J). A protein isolate for food by phosphorylation of yeast homogenate. Food Chemistry 31(4); 1989; 279-288

A significant increase in protein extraction from Torula utilis homogenate and substantial decrease in nucleic acid content (60%) in the resulting isolate was obtained by protein phosphorylation with sodium trimetaphosphate (STMP). Optimal conditions for this process were pH, 11.0; temp. 38 C and concn. of STMP, 3%. This modification markedly improves such functional properties as solubility, emulsifying activity, foaming capacity and fat and water absorption capacity. The enzymatic digestibility is only lowered by about 10%. AS

2120 Prior (BA), Kilian (SG) and Du Preez (JC). Fermentation of D-xylose by the yeast Candida shehatae and Pichia stipitis prospects and problems. Process Biochemistry 24(1); 1989; 21-32

This review discusses fermentation of D-xylose by the yeast Candida shehatae and Pichia stipitis prspects and problems. It covers tanonomic relationships between C. shehatae and P. stipitis strains; comparison of the D-xylose fermenting ability of C. shehatae and C. stipitis fermentation of suagr other than D-xylose; metabolism of hemicellosic sugars; factors regulating D xylose fermentations; fermentation of hemicellulose hydrolysates; prospects and problems. NGKR

Rhodotorula minuta

2121 Fujii (T), Ohga (Y), Ogawa (T) and Fukuda (H). The role of L-phenylalanine in the production of isobutene by **Rhodotorula minuta**. **Journal of Fermentation Technology '(Hokko Kogaku Zasshi')** 67(2); 1989; 115-118

In this paper the role of L-phenylalanine in the production of isobutene from the view of protein synthesis by **Rhodotorula minuta** has been discussed. Many aromatic carboxylic acids had been found to have the same effect on the production of isobutene as L-phenylalanine. Cycloheximide an inhibitor of protein synthesis inhibited the synergistic effect of L-phenylalanine on the production of isobutene. The results confirmed the finding that L-phenylalanine is an inducer of a tentative "isobutene forming enzyme" in **Rhodotorula minuta**. NGKR

Hygiene

Bacteria

Listeria

2122 Cox (LJ), Kleiss (T), Cordier (FL), Cordellana (C), Konkel (P), Pedrazz ni (C), Beumer (R) and Siebenga (A). **Listeria** spp. in food processing, non-food and domestic environments. **Food Microbiology** 6(1); 1989; 49-61

The occurrence of **Listeria** spp. was investigated in 17 food factories (representing six different product groups), 35 Dutch households and in a sawmill. The aim of this study was to assess their distribution in these environments, possible measures for their control and the likelihood of human exposure to these organisms from sources other than foods or faeces. In food factories, **Listeria** were found in drains, floors, standing water, residues and food-contact surfaces in descending order of frequency. In two dry culinary food units, no samples were found to be contaminated. These results indicate that dry conditions and the restriction of food residues contribute to the control of these organisms. From kitchens in 35 households chosen at random, seven (20%) were found to be contaminated with **Listeria**. They were isolated from refrigerators (one swab), dish cloths (six from seven samples) and from two dustbins. It seems that dish cloths could be an important source of these organisms in the home. In the environment of the sawmill, **L. ivanovil** was isolated more frequently than any other sp. This was interpreted in terms of the availability of xylose, a wood breakdown product, in such environments. Although listeriosis outbreaks have been associated with foods, most cases are of unknown origin. This study indicates that **Listeria** are common in many environments and that epidemiological studies should conc. on these as well as foods. In view of the large number of sources of listerias in the natural environment, the domestic environment and in raw foods prepared in the home, human beings are exposed to these organisms on a regular basis. Scrupulous personal and domestic hygiene to diminish cross-contamination could be an important factor in the prevention of human listeriosis. AS

Listeria monocytogenes

2123 Yousef (AE), el-shenaury (MA) and Marth (EH). Inactivation and injury of **Listeria monocytogenes** in a minimal medium as affected by benzoic acid and incubation temperature Journal of Food Science 54(3); 1989; 650-652

The population of **Listeria monocytogenes** in a minimal medium (lacking a N) at pH 5.5 decreased logarithmically during incubation. Rate of death of the pathogen, indicated by D-values, was greatly affected by changes in the temp. of incubation (4-35 C), but to a much lesser extent by the presence of benzoic acid (3000 p.p.m.) Injury of L. **monocytogenes** during incubation was equally detectable on tryptose agar containing 6% salt and McBride Listeria Agar containing 0.5% lithium chloride. A greater degree of injury was detected at the lower than the higher temp. of incubation, but presence of benzoic acid (3000 p.p.m.) did not seem to affect the extent of injury. AS

BIOTECHNOLOGY

2124 Bonastre (N) and Paris (JM). Survey of laboratory pilot, and industrial anaerobic filter installations. Process Biochemistry 24(1); 1989; 15-20

This review describes installations of various reactors and surveys the basic operational conditions of this process. This discusses influence of operational parameters, support influence laboratory scale applicaiton of anaerobic filters to waste water treatment pilot and industrial scale applications of anaerobic filters to waste water treatment and conclusions. NGKR

2125 Mourot (P), Lafrance (M) and Oliv (M). Aseptic concentration of living microbial cells by cross-flow filtration. Process Biochemistry 24(1); 1989; 3-8

In this paper the concn. of living microbial cells by commercial membranes and modules was evaluated for **Lactobacillus acidophilus** and Brady **Rhizobium japonicum** microbial preparations. The performance in terms of permeate concn. flux rates and the reproducibility of cleaning procedures were investigated. Survival rates after freeze drying were compared for three different processes viz. no concn. after fermentation, concn. by continuous centrifugation, and concn. by cross flow filtration. It was found that this last process was sucessful for both cultures without apparent damage to the cells. The survival rates for L. acidophilus could be increased by partial elimination of the various low mol. wt. quality products and this technology can be adopted for other cultures. NGKR

TISSUE CULTURE

Nil

FOOD ADDITIVES

Antioxidants

2126 Toyosaki (T) and Mineshita (T). Antioxidant effect of riboflavin in aqueous solution. Journal of Agricultural and Food Chemistry 37(2); 1989; 286-289

The antioxidant effects of riboflavin in aqueous solution under irradiation and in the dark were studied. When measurements were made soon after treatment, the linoleic acid hydroperoxide produced increased as the concn. of riboflavin increased The linoleic acid hydroperoxide produced during light irradiation might arise because of active oxygen produced by the light-sensitizing effect of riboflavin. When the solution was left in the dark after light irraditation and assayed later, the decomposition of hydroperoxide and the recovery at 444 nm tended to increase with higher concn. of riboflavin. The recovery at 444 nm in the dark might result from a reversible reaction if the reduced was produced by light irradiation to be oxidized form, in the dark. These results suggested that hydroperoxide acted as an electron acceptor in the reversible reaction and that this radical might participate in the reversible reaction from the reduced to the oxidized form, thereby becoming decomposed. AS

Stabilizers

Gums

Carrageenan

2127 Rotbart (M), Neeman (I), Nussinovitch (A), Kopelman (IJ) and Cogan (U). The extraction of carrageenan and its effect on the gel texture. International Journal of Food Science and Technology 23(6); 1988; 591-599

Carrageenan was extracted from Eucheuma cottonii under various conditions of temp., alkalinity and time. The effect of process parameters on the rheological properties of the resulting carrageenan gels was studied. Raising the extraction temp. from 100 to 110 C under alkaline conditions increased the 3,6-anhydrogalactose content, and extending the period of extraction up to 3 h yielded gels with a higher gel strength and deformability modulus. Carrageenan gels were evaluated by compression on a Universal testing machine linked to microcomputer system. This enabled continuous accumulation and processing of the force-deformation data. The computerized method for texture analysis, presented in this study, enables rapid and accurate assessment of the gelling properties of crude carrageenans and of mixtures with other additives. AS

CEREALS

2128 Azyln (KL), Toma (RB), Koval (JE) and Christopler (S). Formulation and sensory evaluation of a low calorie fiber bar. Journal of Food Science 54(3); 1989; 727-729

Three levels of fiber were incorporated, and five combinations of wheat and corn bran were evaluated in formulating the fiber bars. A total of 15 fiber-bar variations were tested for physical characteristics and subjected to sensory evaluation by trained taste panelists. The three fiber-bar variations which were ranked highest by the sensory panel were also tested by consumer sensory evaluation. Findings indicated that the optimum level of fiber replacement of flour were 20% by wt At this level of replacement, either all wheat bran or a mixture containing a max. of half corn and half wheat was found by consumer sensory evaluation to produce acceptable fiber bars. AS

2129 McCleary (BV) and Codd (R). Measurement of beta-amylase in cereal flours and commercial enzyme preparations. Journal of Cereal Science 9(1); 1988; 17-33

A procedure previously developed for the assay of cereal-flour beta-amylase has been improved and standardised. The improved procedure uses the substrate-P-nitrophenyl maltopentaose (PNPG5) in the presence of near saturating levels of alpha-glucosidase, PNPG5 is rapidly hydrolysed by beta-amylase but less readily by cereal alpha-amylases. The substrate is hydrolysed by beta-amylase to maltose and p-nitrophenyl maltotriose (PNPG3). With the levels of alpha-glucosidase used in the substrate mixture, PNPG3 is rapidly cleaved to glucose and p-nitrophenol, whereas PNPG5 is resistant to hydrolysis by the Alpha-glucosidase. The assay procedure has been standardised for several beta-amylases and the exact degree of interference by cereal alpha-amylases determined. The procedure can be radiely applied to the selective measurement of beta-amylase activity in cereal and malted cereal flours. AS

2130 Saini (HS). Thermal stability of protease inhibitors in some cereals and legumes. Food Chemistry 32(1); 1989; 59-67

The thermal stability of trypsin and chymotrypsin inhibitor activities in soybeans, mungbeans, rye and triticale was investigated. Both trypsin and chymotrypsin inhibitors were resistant to dry heat and retained more than 50% activity after heating at 105 C for 15 min. Autoclaving for 5 min of 121 C virtually destroyed trypsin and chymotrypsin inhibitor activities both in legumes and cereals. Trypsin and chymotrypsin inhibitors were readily extractable in tris-HCl buffer (pH 8.0 0.1 M containing 10 mM CaCl) and were assayed using chromogenic substrates. Heating the extracts at 100 C for 15 min did not remove trypsin and chymotrypsin inhibitors completely. If the dry heat treatment is to be applied to inactivate protease inhibitors, high temp. above 120 C should be selected. AS

2131 Sashidhar Rao (B), Sudershan Rao (V), Ramakrishna (Y) and Bhat (RV). Rapid and specific method for screening ergosterol as an index of fungal contamination in cereal grains. Food Chemistry 31(1); 1989; 51-56

Ergosterol is used as an effective biochemical marker for fungal contamination in food grains. A simple and rapid qualitative method for screening ergosterol in cereal grains is described. The method involves the formation of a highly fluorescent addition product of ergosterol after an iodination reaction. Iodinated ergosterol shows a characteristics greenish-blue fluorescence under longwave ultraviolet light. Further, chemical confirmatory tests are also incorporated for identifying ergosterol. The method developed may be used in the food industry, and for routine surveillance of cereal grains for fungal contamination. AS

Barley

2132 Ahokas (H) and Naskali (L). High-lysine barley screening with fluorometry and endoproteolytic assays. Cereal Chemistry 66(2); 1989; 135-138

2-(N-morpholine) ethanesulphonic acid-buffered sodium dodecyl sulphate extracts of barley meal were assayed with two fluorometric methods, using either fluorescamine or O-phthalaldehyde as the fluorochrome. Both methods, especially fluorescamine, showed a good agreement with the lysine content but a less strong correlation with protein content. In a third assay, digestion of meal samples with endoproteinase Lys-C, hydrolyzing polypeptides at the carboxyl end of lysyl residues, resulted in an increase of amino teminals. This increase was detected with ninhydrin. Ninhydrin absorbances showed a linear correlation with lusine content. The protein content of the digested or undigested extracts could be reliably estimated from the absorbances at 215 and 225 nm. AS

Barley flour

2133 Zawistowska (U), Langstaff (J) and Bushuk (W). Improving effect of a natural alpha-amylase inhibitor on the baking quality of wheat flour containing malted barley flour. Journal of Cereal Science 8(2); 1988; 207-209

Addition of the alpha-amylase inhibitor isolated from barley as one of the bread ingredients completely neutrallized the detrimental effect of excess alpha-amylase. The size and the appearance of the loaf were essentially the same as those of control loaf. PHR

Oats

2134 Egorov (TA). The amino acid sequence of the 'fast' avenin component (Avena sativa L.). Journal of Cereal Science 8(3); 1988; 289-292

Oat prolamines (Avenins) isolation from oat var. 'Narymsky 943' and its structure detn. has been described in detail. From this they have reconstructed the complete primary structure of avenin N Avenin N9 consists of 182 amino acid residues and its amino acid comp. and sequence are characteristic of prolamins. It contains 30.7 mol % glutamine, 11.5 mol % protein, 4 mol % cysteine, 1.6 mol % methionine, and 60 mol % hydrophobic amino acids. It has unique N-terminal amino acid sequence (residues 1-10) and has three sequence repeats of the type PFVQn where n = 3, 4 or 5 and does not contain polyglutamine regions. CMS

2135 Welch (RW) and Lloyd (JD). Kernel (1 -3) (1-4)-Beta-D-glucan content of oat genotypes. Journal of Cereal Science 9(1); 1989; 35-40

A method for the estimation of (1-3) (1-4)-beta-D-glucan in oats-involving alkali extraction at 45 C, precipitation with Calcofluor and the colorimetric estimation of glucose has been modified and compared with a hydrazinolysis procedure. Close agreement between the methods was found for oat kernels and for oat bran samples. This indicates that the Beta-glucan of oats was completely soluble under the conditions used. Comparison of the modified Calcofluor method with previous results also showed a reasonable agreement for total beta-glucan content. The modified Calcofluor method which is suitable for small samples has been used to analyse kernels from 100 diverse oat genotypes. Significant genotype differences were found and kernel beta-glucan levels ranged from 3.2 to 6.3%. Associations between beta-glucan and other kernel and plant characteristics were weak, indicating that it is possible to manipulate the beta-glucan content of high-yielding oat var. by plant breeding. However, the modified Calcofluor method gave a low value of beta-glucan content, compared with the hydrazinolysis procedure, with a sample of barley and appears unsuitable for this sp. AS

2136 Wood (PJ), Weisz (J), Fedec (P) and Burrows (VD). Large-scale praparation and properties of oat fractions enriched in (1-3) (1-4)-Beta-D-glucan. Cereal Chemistry 66(2); 1989; 97-103

Large amounts (Kg) of oat gum, the major component of which is (1-3) (1-4)-Beta-D-glucan (Beta-glucan) and oat bran were prepared for nutritional studies using pilot plant equipment. Bran fractions, containing from 10.9 to 16.6% Beta-glucan and which were used to increase the yield of gum, were prepared by air-classification of hexane-defatted flour or of full-fat flour, and by simple sieving techniques. Defatted, air-classified bran after refluxing in ethanol to deactivate enzymes, was extracted with sodium carbonate at pH 10 to give oat gum containing 78% Beta-glucan. This material was found to exhibit significantly lower viscosity than material prepared at the bench. Monitoring the pilot process showed that the major viscosity losses occurred during centrifuging. Oat gums were pseudoplastic in aqueous solution, but under conditions of high shear there was a permanent loss in viscosity. This was reflected in reduced mol. size as shown by high-performance gel chromatography, which also revealed bench-prepared oat gum to be of higher mol. wt. than pilot plant gum. No difference in the major structural characteristics was detected between pilot plant material and bench material or between Beta-glucan derived from the inner and outer parts of the grain. AS

Rice

2137 El-Shirbeeny (A) and Mitkees (R). The use of gamma irradiation for inducing high-protein rice. **Cereal Chemistry** 66(2); 1989; 79-80

This study investigated the possibility of using gamma irradiation to improve protein content in the rice breeding program in Egypt. Brown rice samples from M_2 and M_3 mutants of three var., Giza 172, Ratna, and IR480, were irradiated at three doses of cobalt 60 gamma rays. Protein content of the irradiated samples was compared with an unradiated control. Coeff. of variation were compared to elucidate which var. might contain genetic material capable of increasing protein content. The results indicated that considerable improvement in protein content could be achieved by breeding selections of Giza 172, in M_3 it reached 13.31% protein after irradiation at 10,000 roentgen, an increase of 47% over the control. Materials from IR480 showed the least variability, and hence least potential for improvement. AS

2138 Gras (PW), Jonathan Banks (H), Bason (ML) and Arriola (LP). A quantitative study of the influence of temperature, water activity and storage atmosphere on the yellowing of milled rice. **Journal of Cereal Science** 9(1); 1989; 77-89

Rates of yellowing were determined for two Australian rice cvs. The rates, k, were well described by the model K = alpha $e^{\beta T}$ (water activity)$^{\delta}$, where T is the absolute temp. and alpha, Beta, Gamma and Delta are constants. The influence of temp. and water activity were predominant. Carbon dioxide concn. had no significant effect. The actions of temp. and oxygen concn. were independent of var., but that of water activity showed a small varietal dependence. The results are consistent with non-enzymatic browning as the mechanism of yellowing. The model predicts a discernible increase in yellowness (0.3 Hunterlab \`b' units) in as little as 42 days storage under typical tropical conditions (30 C, 70% r.h. air) and may help to explain the occurrence of individually yellowed grains in poorly dried or stored rice. Rates of yellowing calculated from the model were consistent with the very limited data already published, and can be used to define the storage environment and time required to produce a particular yellowness for markets preferring aged rice. AS

2139 Nkama (I) and Mullar (HG). Effects of initial moisture and light intensity on the photodegradation of aflatoxin B_1 in contaminated rice. **Journal of Cereal Science** 8(3); 1988; 269-274

Contaminated milled rice containing 1100 u g aflatoxin B per kg was adjusted to various initial moisture contents (14-24%), then exposed to light intensities of 43 mW/ cm^2 and 64 mW/cm^2 at 36 C and 42 C resp. for different periods up to 24 h. The results indicate that all treatments caused a decrease of aflatoxin B_1

However, at 43 mW/cm^2 and 36 C, increase in sample initial moisture content led to a reduction in the amounts of aflatoxin recovered, with mean values of 413, 352 and 351 μ g toxin/kg rice at 14.1, 18.7 and 24.4% initial moisture content resp. At 64 mW/cm^2 and 42 C, increase in sample initial moisture content led to an increase in the amounts of toxin recovered, with mean values of 238, 276 and 286 μ g toxin/kg rice at 14.1, 18.7 and 24.4%. Initial moisture content resp. High light intensity appears to cause rapid moisture loss and therefore reduced rate of toxin degradation. Visual examination of samples suggested that the varying degree of particle agglomeration resulting from the method of direct water addition may contribute to the increased aflatoxin recovery at higher initial moisture contents, due to limited penetration of light. AS

2140 Nkma (I) and Muller (HG). Studies on aflatoxin in rice. Description and evaluation of a new apparatus for the separation of husk from dehulled rice contaminated with aflatoxin. **Journal of the Science of Food and Agriculture** 46(3); 1989; 311-318

A simple apparatus and method developed for the separation of husk from dehulled (brown) rice contaminated with aflatoxin is described. The performance and efficiency of the apparatus was evaluated by passing a series of dehulled rice and husk mixtures through it. Subsequently the aflatoxin distribution in both rice and husk was determined. The range was 24 to 81% for aflatoxin Band 11 to 76% for B_1 depending on the rice grain category for aflatoxin B_1 and variety. The study indicates that the apparatus can be used conveniently to separate husk from aflatoxin-containated rice with a min. hazard to personnel. It is therefore recommended for use particularly in developing countries, where lab. test mills may not be available. AS

2141 Ramarathnam (N), Osawa (T), Namiki (M) and Kawakishi (S). Chemical studies on novel rice hull antioxidants. 2. Identification of isovitexin, A C-glycosyl flavonoid. **Journal of Agricultural and Food Chemistry** 37(2); 1989; 316-319

Methanol extract of rice hull from long-life rice seeds, having strong antioxidant activity, was fractionated by column chromatography and HPLC technique, and the active components were characterized by FAB-MS, ^{1}H NMR, and ^{13}C NMR techniques. The active components were found to be flavonoid substances, and one of them exhibiting antioxidant property as strong as alpha-tocopherol was identified as isovitexin, a C-glycosyl flavonoid. AS

2142 Reyes (VGJr) and Jindal (VK). Conduction heating of high moisture rough rice. II. Safe temporary storage. **Journal of Food Process Engineering** 11(1); 1989; 1-15

This paper reports results of study on conduction heating of high moisture rough rice and safe temp. storage. Heating, storage exp. on rough rice were carried out by measurement of fungal activity, milling quality evaluation, detn. of discoloured kernels, discolouration of milled rice due to fungal infection. It was found that fungal growth was reduced by high temp. conduction heating and thus preventing the spoilage of feshly harvested high moisture rough rice leading to its safe temp. storage. Fungal mortality levels equal to 90% and higher were found to be satisfactory for general use and a relationship was developed for estimating the safe storage periods of heat treated high moisture rough rice based on its moisture content and fungal mortality level achieved with various heat treatments. NGKR

2143 Snow (SD) and Brooks (JR). Fractionation of rice glutelin polypeptides using gel filtration chromatography. Journal of Food Science 54(3); 1989; 730-733

Preparative gel filtration chromatography using Sepharose CL-6B was utilized to obtain working quantities of dissociated rice glutelin polypeptides. Rice flour samples were extracted and fractionated using dilute Tris buffer containing either 0.5% SDS, 6M urea or 8M urea. Gel filtration under each set of extraction conditions yielded fractions containing dissociated acidic and basic glutelin polypeptides, but acidic polypeptides were more effectively separated from basic polypeptides in urea than in SDS. The presence of glutelin polypeptides in higher mol. wt. aggregates under each set of buffer conditions indicated that the dissociation of these components during extraction was not complete. AS

Ryes

2144 Delcour (JA), Vanhamel (S) and De geest (C). Physico-chemical and functional properties of rye nonstarchy polysaccharides. Colorimetric analysis of pentosans and their relative monosaccharide compositions in fractionated (milled) rye products. Cereal Chemistry 66(2); 1989; 107-111

The water-soluble enzyme-extractable, and total pentosans (WSP, EEP, and TP, resp.) of rye kernels were estimated by a modification of the orcinol-hydrochloric acid method of Hashimoto et all (1987 a). Modifications included absorbance readings both at 670 and 580 nm to minimize the small but significant interference by hexose sugars in the analytical figures and appropriate dilution of the pentosan extracts before analysis, as rye contains more pentosans than wheat. The relative monosaccharide ratios in the different milling extracts were estimated by gas chromatography of the alditol acetates of the monosaccharides released upon hydrolysis of the pentosan extracts. The highest proportion of TP was in the bran, whereas the shorts contained the highest proportion of both the WSP and the EEP The proportion of WSP and EEP relative to the TP varied widely. D-(+)-Xylose and L-(+)-arabinose were the most abundant monosaccharides, along with significant amounts of D-(+)-glucose. D-(+)-Galactose, and D-(+)-mannose were present in trace amounts. The WSP in different milling fractions had smaller variations in the arabinose/xylose ratios (0.76-0.81) than was observed for the EEP (0.58-0.80) and TP (0.74-1.09). The EEP and TP were relatively richer in xylose for the bran and the short fractions as opposed to what was found for the fine flour fractions. AS

2145 Valdimarsodottir (T), Glad (C) and Nair (BN). A sandwich inhibition enzyme-linked immunosorbent assay of water-soluble pentosans in rye grain. Food Chemistry 32(2); 1989; 81-97

A sandwich ELISA for detn. of fraction II from a DEAE ion-exchange column fractionation of water -soluble rye pentosans is described. A modification of this method, called a sandwich inhibition ELISA, is also described to determine pentosans in whole-rye grains. This procedure includes the following steps: (1) antibody is bound to a polystyrene solid phase, (2) the immunogen to be assayed is reacted with the bound antibody, (3) a second antigen is reacted with the untreated antibody, (4) the enzyme-labelled antibody is reacted with the second antigen, (5) the enzyme activity of the bound enzyme labelled antibody is then measured. This activity decreases with increasing immunogen content. The assay can be used in the range of concn. between 2 and 100 u g for water-soluble rye pentosans. Procedures for preparation of the samples, production and separation of the antibodies and the conjugate are described. AS

Wheat

2146 Bettge (A), Rubenthaler (GL) and Pomeranz (Y). Alveograph algorithms to predict-functional properties of wheat in bread and cookie baking. Cereal Chemistry 66(2); 1989; 81-86

A total of 73 wheat samples varying in hardness were analysed for gross composition, and flour texture. The flours from these were subjected to Alveograph studies and baked into cookies and bread. A multivariable model to predict the various quality parameters, such as loaf vol., specific vol. and cookie dia, produced the highest correlation coeff., using combination of protein hardness and P, L, and W values from Alveograph. The equations were verified using flours with known gross comp. and end use parameters. AR

2147 Burnouf (T) and Bietz (JA). Rapid purification of wheat glutenin for reversed-phase high performance liquid chromatography. Comparison of dimethyl sulphoxide with traditional solvent. Cereal Chemistry 66(2); 1989; 121-127

Purification of wheat glutenin free of albumins, globulins and gliadins for RP-HPLC using the usual solvents containing 70% ethanol, 60% acetonitrite ZM dimethyl (formamide, urea or combination of 70% ethanol with acetic acid and Beta-mercatoethanol was not efficient. However soluble proteins and gliadin were completely extracted with 0.7% acetic acid and aluminum lactate-lactic acid buffer (pH 3.1). Extraction with > 90(v/v) dimethyl sulphoxide, followed by washing the pellet with 70% ethanol gave pure glutenin which was also free of starch contamination. It was readily soluble after reduction and pyridylethylation and could be analysed by RP-HPLC. AR

2148 Cubadda (R). Current research and future needs in durum wheat chemistry and technology. Cereal Foods World 34(2); 1989; 206-209

This feature article reviews extensively the current research on durum wheats. The article covers important aspects such as (i) relationship between components of cooking quality, (ii) developments of analytical methods for quality evaluation, (iii) advances in the technology of pasta and effect of processing on its quality and (iv) future research needs. PHR

2149 Curioni (A), Dalbelin Peruffo (A) and Pogna (NE). Electroendosmotic preparative electrophoresis as a one step method for purification of high molecular weight subunits of wheat glutenin. **Cereal Chemistry** 66(2); 1989; 133-135

The purification technique using electroendosmotic preparative electrophoresis (EPE) permitted one step preparation of all high mol. wt. glutenin subunits of wheat flour in just 10-12 h. Using SDS-EPE large amounts (10-20 mg) of each subunits could be prepared for structure analyses or for detn. of functionality of glutenin in breadmaking. AR

2150 Sanderson (DB), Muir (WE), Sinha (RN), Tuma (D) and Kitson (CI) Evaluation of a model of drying and deterioration of stored wheat at near-ambient conditions. **Journal of Agricultural Engineering Research** 42(3); 1989; 219-233

Drying and deterioration models of stored wheat at near-ambient conditions were tested using replicated storage environments in 0.61 and 1.22 m diameter bins, 3.66 m in height. The bins were located in Winnipeg, Manitoba, Canada. Fifteen storage environments were tested spanning three grain storage yrs, incorporating airflow rates from 0.8 to 231 s^{-1} per m^3 of wheat and initial grain moisture contents of 15 to 25%. The grain drying model predicted slower than measured during rates. The deterioration model predicted spoilage earlier than that observed in the experimental bins. Nevertheless, the drying and deterioration models are sufficiently accurate to be used as design tools to predict airflow rates required to cool and dry stored wheat. AS

2151 Sanderson (DB), Muir (WE) and Sinha (RN). Intergranular air temperature of ventilated bulks of wheat. **Journal of Agricultural Engineering Research** 40(1); 1989; 33-43

The effects of ventilation rates, initial moisture content(MC) of varying weather conditions, and fan control strategies on the movement and shapes of temp. fronts with in a ventilated wheat bulk in three harvest yrs were studied. Low temp. grain ventilation facility consisted of 0.61 and 1.22 meter diam. bins 3.66 meter in height holding wheat ranging in MC from 15% to 25% w.b. The results showed that speed of temp. fronts were approx. proportional to ventilation rates, and evaporative cooling in the drying front facilitated the use of temp. measurement to locate the drying front during forced ventilation. It is envisaged ventilation control strategies that incorporate times of no forced ventilation of over 12 h a 0.61 diam. bin may not sufficiently model a larger bin due to larger radial heat transfer. RS

2152 Sanderson (DB), Muir (WE) and Sinha (RN). Moisture contents within bulks of wheat ventilated with near-ambient air. Experimental results. Journal of Agricultural Engineering Research 40(1); 1989; 45-55

The objective of this paper was to report the effect of ventilation rates, initial moisture content(MC) of the grain, varying weather conditions and fan control strategies on the movement and shapes of moisture fronts with in ventilated wheat bulks in three harvest yrs. The facility consisted of 0.61 m and 1.22 m. diameter bins 3.66 m in height holding wheat ranging in MC. from 15% to 24% w.b. The results indicated that the speed of drying fronts were not linearly proportional to air flow rates, doubling the airflow resulted in upto a 2.5 times increase in the drying rate over the same drying period, and continuous ventilation during period of high humidity continued to more the drying through the bin. No appropriate differences were noted between the 1.22 m diameter bin and its matched air flow bin with 0.61 m. diameter. RS

2153 Scanlon (MG), Sapirstein (HD) and Bushuk (W). Evaluation of the precision of high performance liquid chromatography for wheat cultivar identifications. Cereal Chemistry 66(2); 1989; 112-116

The study is the reproducibility of computer-derived RP-HPLC quantitation parameters based on 65 chromatograms of gliadin extracts of bread wheat cvs showed that the prolonged use of same column significantly retarded peak retention times especially for early eluting components. The results indicated that without appropriate normalization, the peak retention times lack sufficient long term precision in order to obtain reliable results for identification of cvs. AR

2154 Strandberg (T), Kervinen (R) and Linko (P). Extrusion cooking of sprout-damaged wheat. Journal of Cereal Science 8(2); 1988; 111-123

The influence of extrusion cooking on the properties of sprout-damaged wheat has been investigated under various process conditions by employing regression analysis. The extrusion cooking was carried out using a Clextral BC 45 twin-screw extruder with 500 mm co-rotating screws. Screw speed (90-210 r/min), total feed rate (200-600 g/min), mass temp. before the die (105-195 C) and moisture content of the mass feed (12-30%) were chosen as input variables. The mass temp. and feed moisture content usually dominated in determining the properties of the extruded products. The highest residual alpha-amylase activities and the lowest water absorptions were obtained at low mass temp. and high feed moisture levels. The importance of the findings in specialty animal feed production is discussed. AS

Wheat bran

2155 Galliard (T) and Gallagher (DM) The effects of wheat bran particle size and storage period on bran flavour and baking quality of bran flour blends. Journal of Cereal Science 8(2); 1988; 147-154

Commercially produced wheat bran was stored at + 20 or - 20 C, both as received and after further milling to give batches with different particle size distributions. The rates of deterioration of the bran and bran/flour blends were monitored by measurements of fatty acid contents and oxygen uptake of aqueous suspensions. During storage over 21 wks the bran samples and bran/flour blends were subjected to sensory analysis. After storage for 4 wks untreated bran and finely milled (< 0.5 mm) bran were blended with flour and baked into bread. The rates of deterioration were dependent upon particle size distribution in the bran. Finely milled bran, after storage at 20 C for 4 wks, gave a significantly lower loaf vol. compared with untreated bran stored at + 20 C or with finely-milled bran stored at -20 C. However, no significant differences in bread flavour were detected. The off-flavour intensity of bran-water mixtures increased as particle size decreased, and the differences in intensity between particle size fractions increased with the time of storage. Off-flavour intensity scores, as reported by a taste panel, were high correlated with oxygen uptake capacity (r 0.998; P < 0.001) and fatty acid content (r 0.993; P < 0.01) of the bran samples. AS

Wheat flour

2156 Sebecic (B). Factors affecting wheat flour amylographic maximum viscosity. Journal of Food Science 54(3); 1989; 610-617

To explain differences in amylolytic activity of flour determined by amylograph and by reliable chemical methods, the influence of starch concn., the physicochemical properties of starch and the effect of alpha-amylase on the viscosity max. of flours and isolated starches was studied. Differences in viscosity of flours were partly due to the differences in starch concn. in suspensions. The viscosity max. of inactivated flour and isolated starch depended on starch physicochemical properties ($r = 0.957$ and $r = 0.992$ resp.) and concn. The decrease in viscosity max. due to activity of alpha-amylase was associated with the amount of hydrolyzed starch ($r = 0.986$) and depended on both physicochemical properties of starch and concn. of alpha-amylase. Neither the viscosity max. nor the decrease in viscosity max. was a reliable indicator of amylolytic activity AS

Wheat proteins

Gluten

2157 Weegels (PL) and Hamer (RJ). Predicting the baking quality of gluten. Cereal Foods World 34(2); 1989; 210-215

The authors have developed a simple test to measure the degree of heat damage of gluten by calculating the heat-denaturation index from the ratio between the sedimentation value of untreated gluten and the treated glutens. A gluten samples with a low heat of denaturation will give a low index value (< 0.5) a sample with a high extent of denaturation will give an index value close to one. They have also developed a model to predict the baking quality of gluten based on denaturation index eathsigraps resistance and protein content of the glutens samples. The model provides a correlations coeff. of $r = 0.75$ between measured and predicted breadmaking quality. PHR

Glutenin

2158 Payne (PI), Look Hart (GL) and Forsynth (SA). High molecular weight glutenin subunit composition of two closely related lines of wheat that have contrasting breadmaking quality. Journal of Cereal Science 8(3); 1988; 285-288

This study on two closely related types of wheat having different bread making qualities showed that a good bread wheat did not contain a of high mol. wt. sub units of glutenin coded by genes on chromosome ID. PHR

Wheat starch

2159 Berry (CS), I anson (K), Miles (MJ), Morris (VJ) and Russell (PL). Physical-chemical characterization of resistant starches from wheat. Journal of Cereal Science 8(2); 1988; 203-206

Characterisation of Resistant Starch (RS) from wheat indicated that RS fractions isolated after enzymic hydrolysis are B-type crystals comprising low mol. wt. unbranched amylose chains (DP approx. 60). Enzymic (alpha-amylase and pullulanase) hydrolysis substantially improves the quality of the x ray powder diffraction. PHR

2160 Holm (J), Biorck (I) and Eliasson (A-C). Effect of thermal processing of wheat on starch. I. Physico-chemical and functional properties. Journal of Cereal Science 8(3); 1988; 249-260

Whole grain wheat and white flour were extrusion-cooked, drum-dried, popped dry-autoclaved or steam-flaked under conditions corresponding to the upper (u) and lower limit (1) of what is normally used commercially. The starch in both steam-flaked and dry-autoclaved (1) wheat samples was gelatinized incompletely as measured by differential scanning calorimetry (DSC) or enzymically with glucoamylase. DSC-measurments also indicated an increased resistance to further gelatinization of starch in dry-autoclaved (1) wheat, as shown by an increase of 9 C in the gelatinization temp. Extrusion-cooking and popping led to macromolecular degradation of starch, as observed by gel permeation chromatography. Starch degradation was most extensive during popping (u), and an increase in reducing sugar content was observed. Popped (u) wheat and extruded flours also showed the lowest hot paste and final cooked paste amylograph viscosities, and the highest water solubilities of starch. Popped (u), drum-dried and extrusion-cooked samples showed a decrease in viscosity on heating to 95 C. Popped (1), dry-autoclaved and steam-flaked samples showed low initial viscosities at low temp., which increased on heating, and low water solubilities of starch. The amylograms also indicated remaining intrinsic alpha-amylase activity in popped (1), dry-autoclaved and steam-flaked wheat. AS

2161 Holm (J) and Bjorck (I). Effects of thermal processing of wheat on starch. II. Enzymic availability Journal of Cereal Science 8(3); 1988; 261-268

The availability of porcine pancreatic alpha-amylase of starch after extrusion-cooking, drum-drying, popping, dry-autoclaving and steam-flaking of wheat was studied. The processes were performed under conditions corresponding to the apper (u) and lower limit (1) of what is normally used commercially. Raw and boiled flour were used as reference. Steam-flaked (1) and dry-autoclaved (1) wheat showed the lowest availability to alpha-amylases, primarily due to low degrees of gelatinization. The availability to Alpha-amylase of starch in popped (1) and steam-flaked (u) wheat was intermediate. Dry-autoclaved (u) wheat showed a low initial and high late phase of alpha-amylolysis. Drum-drying resulted in a lower availability to alpha-amylase than extrusion cooking. Popped (u) wheat showed the highest rate of alpha-amylolysis, and its starch was slightly more available than in extruded flours. Preincubation with pepsin increased substantially the availability to alpha-amylases in raw, boiled and drum-dried flours, but did not affect the availability of starch in the other processed samples. Consequently, starch-protein interactions in drum-dried flours decreased the course of alpha-amylolysis. When both pepsin and alpha-amylases were used, the starch in extrusion-cooked and drum-dried materials was equally available, and the availability was independent or processing conditions used. With popping, steam-flaking and dry-autoclaving more severe conditions resulted in more rapid alpha-amylolysis. AS

2162 Lai (CS), Guetzlaff (J) and Hoseney (RC). Role of sodium bicarbonate and trapped air in extrusion. Cereal Chemistry 66(2); 1989; 69-73

Addition of sodium bicarbonate or sodium carbonate to wheat starch improved expansion of the extrudate but weakened its structure and caused browning. The added bicarbonate or carbonate appeared to react with the acids formed from oxidation of starch during extrusion. Addition of acidulants to bicarbonate further improved the expansion of the extrudate and eliminated the browning problem caused by the bicarbonate. Trapped air appears to provide the major nucleation sites for the bubbles formed during extrusion. AS

MILLETS

Corn

2163 Ajayi (OA) and Clarke (B). High velocity shearing of maize kernels. Journal of Agricultural Engineering Research 42(1); 1989; 15-25

Three var. of maize were subjected to high velocity shear as part of research programme to design more efficient grinding mills. Individual kernels were moved into the path of a high speed knife carried on a rotor and sheared. The shear energy per unit of new surface area was calculated and used as a basis for comparative tests. The main findings were that the shear energy increased markedly with increasing rates of shear and fell with increasing moisture content. Differences in energy requirement due to var. of maize were relatively minor. AS

2164 Das (H), Bhattacharyya (S) and Parashar (BN). Effect of die diameter on characteristics of an extrusion cooked corn-soy-milk snack. Journal of Agricultural Engineering 25(3); 1988; 41-48

This study describes flow behaviour, volumetric output, density and expansion of the corn-soy-milk extrudate, and optimum operating condition of an extruder from the point of view of low energy consumption. A lab. model single screw cooking extruder was developed. The feed at 30% moisture content (wet basis) was made from a mixture of corn flour, soy flour and dry skim milk powder. Extrusion was carried out at 90 C with screw speeds at 40, 50, 60 and 70 rpm and dike openings of 8, 6.35 and 4.75 mm. The extrudate behaved as a psudo-plastic non-Newtonian fluid having a flow behaviour index of 0.3 and consistency coeff. of 13826 pa/s The product had the max. wet density of 1127 kg/m^3 with 6.35 mm die and the max. expansion ratio of 1.105 with 4.75 mm die. Although the rate of production was the highest with 8 mm die, the min specific power consumption of 57.2 KJ/Kg was obtained when the extruder was operated at 70 rpm with 4.75 mm die. AS

2165 Hazell (T) and Johnson (IT). Influence of food processing on iron availability **in vitro** from extruded maize-based snack foods. 46(3); Journal of the Science of Food and Agriculture 46(3) 1989; 365-374

Samples of an extruded maize-based snack food taken at various points during manufacture were digested in vitro under simulated physiological conditions. The proportion of iron diffusing acorss a semi-permeable membrane was used as an index of bioavailability. Iron diffusibility increased from less than 3% in raw whole maize to over 20% in the finished product. Four processing stages were found to be responsible for this enhancement: (1) refining of raw maize, (2) product formulations, (3) extrusion cooking, (4) addition of flavouring. The extrusion cooking process itself was responsible for only a small part of the increase in iron diffusibility. There was a reduction in iron content due to refining, but a small increase in iron content due to product formulation and extrusion cooking. The various factors associated with each stage of snack food manufacture are discussed in relation to their potential influence on iron availability. AS

2166 Jager (T), van Zuilichem (DJ), Stolp (W) and van t Riet (K). Residence time distributions in extrusion-cooking. Part IV. The feed zone of a conical, counter-rotating, twin-screw extruder processing maize grits. Journal of Food Engineering 8(3); 1988; 157-172

The residence time distributions in the feed zone of a counter-rotating, twin-screw extruder processing maize grits, were measured by means of Cu tracer. The detection system was mounted above the transport zone of the extruder. Three different screw pairs were investigated. The residence time distribution measurements were analysed by means of an axial mixing model developed for a twin-screw extruder. The feed rate was found to be the most important variable affecting the average residence time. The average residence time was inversely proportional to the screw speed. Measurements could be simulated by assuming backmixing action over approx. 15% of the axial length of the screw. Geometrical devices in these screw pairs, such as kneading zones and so-called drossel zones (high-shear throttle values), resulted in a significant increase in the average residence time. Their action can be simulated by means of an axial plug-flow model. AS

2167 Peplinski (AJ), Paulsen (RA) and Anderson (RAKwolek (WF). Physical, chemical and dry milling characteristics of corn hybrids from various genotypes. Cereal Chemistry 66(2); 1989; 117-120

The viability, physical properties, chemical position, and dry-milling, responses of six yellow dent corn hybrids having various genotype parents investigated. The experimental design included (1) kernel size, hardness index, breakage susceptibility, flotation, bulk density, 100-kernel wt. and per cent stress cracks as the major physical properties; (2) per cent N fat, starch, ash, fiber, linoleic acid, fat acidity, and N solubility index as compositional parameters; (3) pilot-plant roll dry-milling; and (4) the effects of hybrid and drying temp. on the various properties and dry-milling response. Increasing drying air temp. from 25 to 60 C increased per cent kernel stress cracks from 0-3% to 23-74%, resp., depending on hybrid var. For Stein breakage, the range at 25 C was 1-7% and at 60 C, 3-9%. The dry-milled grit yield was decreased for every corn hybrid by raising drying temp. from 25 to 60 C. Drying temp. had little or no effect on any other physical or chemical characteristics studied, although these other properties did vary significantly with hybrid type. AS

2168 Van Zuilichem (DJ), Jager (T) and Stolp (Wde Swart (JG). Residence time distributions in extrusion cooking. Part III. Mathematical modelling of the axial mixing in a conical, counter-rotating, twin-screw extruder processing maize grits. Journal of Food Engineering 8(2); 1988; 109-127

A mathematical model was developed to simulate the axial mixing in a twin-screw extruder. A comparison is made between the residence time distributions (RTD) predicted by it and measurements on an actual counter-rotating, twin-screw extruder working on maize grits. The measured residence time distribution curves were characterized by their average residence times and Peclet numbers. The model developed contains an infinite series of CSTRs (continuous stirred tank reactors), each one representing four screw chambers. The leakage flows between the screw chambers are described in the model as backmixed flows. With this model, a fairly close simulation of the measured residence time distribution could be made. Mixing in the compression zone proved to be independent of screw speed in the range 40-80 rpm Peclet numbers of 26-34 were measured for the total length of the extruder. As far as biochemical reactions occurring mainly in the high temp. compression zone (120-150 C) are concerned, the upstream axial mixing at the low temp. of the feed zone (60-100 C) may be neglected, in calculating an effective Peclet number for the extruder. This results in calculated effective Peclet numbers of 49-61, whereas values of 26-34 were measured. AS

Pearl millets

2169 Khatarpaul (", and Chauhan (BM). Effect of fermentation by pure cultures of yeasts and lactobacilli on phytic acid and polyphenol content of pearl millet. Journal of Food Science 54(3); 1989; 780-781

Single and mixed pure culture fermentation of pearl millet flour with yeasts and lactobacilli, namely, Saccharomyces diastaticus, Saccharomyces cerevisiae, Lactobacillus brevis and Lactobacillus fermentum, at 30 C for 72 h brought about a significant reduction in phytic acid and polyphenols which were present in considerable amounts in pearl millet flour. Reduction in phytic acid was more pronounced than that in the polyphenols. AS

Sorghum

2170 Osuntogun (BA), Adewusi (SRA), Ogudiwin (JO) and Nwasike (CC). Effect of cultivar, steeping. and malting on tannin total polyphenol and cyanide content of Nigerian sorghum. Cereal Chemistry 66(2); 1989; 87-89

Tannin was estimated in the seeds of 15 Nigerian sorghum cvs., and found to vary between 0.25% (catechin equivalent) for SSV11 and SSV12 and 2.92% for SRN484. Total polyphenol content ranged from 0.32% (tannic acid equivalent) for KSV 13 to 2.7% for SRN484. During steeping (48h), the extractable tannin content of SRN484, KSV7, and SSV3 decreased 33, 27, and 43% resp., during malting (five days) the tannin content decreased an additional 42, 24, and 10% resp. Total extractable polyphenol content of SRN484 and SSV3 was reduced by 41 and 20% during steeping, whereas that of KSV7 was increased by 50%. The polyphenol content also decreased by 22, 68 and 19% for SRN484, KSV7, and SSV3, resp., after malting. Cyanide content of the grains varied from 8 µ g/g for SSV3 to 38 µ g/g for SRN484. After steeping, the cyanide content increased to 44 u g/g for NVW cvs. and 111 µ g/g for SRN484, Whereas the cyanide content of the five samples investigated increased during malting to reach 121, 99, 105, 136 and 78 µ g/g for SRN484, SSV11, KSV8, KSV15, and NVW, resp. The results suggested that all the sorghum cvs except SRN484 could be used in the brewing industry although care should be taken about the cyanide component of the malt. AS

2171 Reddy (V) and Butler (LG). Incorporation of C from (C) phenylalanine into condensed tannin of sorghum grain. Journal of Agricultural and Food Chemistry 37(2); 1989; 383-384

A procedure is described for obtaining condensed tannin from sorghum (Sorghum bicolour (L.) Moench) seeds metabolically labeled from phenylalanine. The C) tannin should be useful in determining the metabolic fate of dietary condensed tannin. AS

2172 Serna-Saldivar (SO), Tellez-Giron (A) and Rooney (LW). Production of tortilla chips from sorghum and maize. Journal of Cereal Science 8(3); 1988; 275-284

White maize (**Zea mays** L.) a tan plant colour white sorghum (**Sorghum bicolor** Moench) and various blends of these were processed into tortilla chips in a pilot plant. The optimum conditions for production of maize and sorghum tortilla chips were: (1) lime-cooking at boiling temp. for 60 and 20 min with 1 and 0.5% lime, resp , (2) quenching to drop the temp. of the cooking liquor to 68 C; (3) steeping the grains for 8-12 h and 4-6 h, resp. The resulting nixtamals (lime cooked and steeped grains) were stone-ground into a coarse dough (masa). The masa was sheeted, cut into triangles and baked for 39 sec at 280 C into tortilla pieces, which were fried from 1 min at 190 C to produce tortilla chips. Under these conditions, maize nixtamal had more dry matter losses than sorghum nixtamal. Both grain masas had similar machinability and contained comparable amounts of moisture. The amount of insoluble dietary fiber increased with increasing sorghum levels. All chips has similar oil uptake during drying. Panelists found that sorghum chips had a bland taste which was significantly different from the characteristic taste of lime-cooked maize. Tortilla chips containing 50% maize had slightly lower ($P < 0.05$) flavour, texture and aroma than maize tortilla chips. Sorghum could be useful for snack products in which a strong maize flavour is not desired by consumers. Up to 50% sorghum blends with maize would produce acceptable products. AS

PULSES

Beans

2173 Paredes-Lopez (O), Maza-Calvino (EC) and Gonzalez-Castaneda (J) Effect of the hardening phenomenon on some physicochemical properties of common bean. **Food Chemistry** 31(3); 1989; 225-236

Several aspects of the hard-to-cook phenomenon in beans (**Phaseolus vulgaris**) were investigated. Two var. of black and light yellow seeds were stored for 135 days at 40 C and 80% rh. Texture measurements produced force-time deformation curves of two peaks for the fresh samples and of three peaks plus a substantial increase in Instron hardness for the aged beans. The damaged starch content of the stored seeds tended to increase. The paste viscosity of flour dispersions from fresh seeds increased outstandingly after storage. Scanning electron microscopy studies showed that longitudinal sections of the cotyledons from hard beans had very densely packed cells, whereas they were loosely arranged in fresh samples. No changes were observed in the gelatinisation temp. of bean flour and isolated starch of hard-to-cook samples, as assessed by differential scanning calorimetry. AS

Chick peas

2174 Ahmed (K), Khalique (F), Afzal (M), Tohir (M) and Malik (BA). Variability in chickpea (**Cicer arietinum** L.) genotypes for resistance to **Callosobruchus maculatus** F. (Bruchidae). **Journal of Stored Products Research** 25(2); 1989; 97-99

Eighteen chickpea (**Cicer arietinum L.**) genotypes were evaluated for their susceptibility to pulse beetle, **Callosobruchus maculatus F.** (Bruchidae) taking into account the number of undamaged seeds (resistance to bruchids) number of eggs oviposited (ovipositional preference), and number of emergence holes (adult survival) per 50 seeds. Resistance to bruchids appeared to be a more heritable trait than the other two damage characters. The number of emergence holes is a better indicator of seed resistance than the number of eggs present on the seeds. AS

Green beans

2175 Adams (JB). Inhibition of green bean lipoxygenase by cyanide. **Food Chemistry** 31(4); 1989; 243-250

Cyanide, probably in the undissociated acid form, is shown to be a weak competitive inhibitor of green bean lipoxygenase (inhibitor constant), K_I = 1.54 10 M KCN). Inhibition of the enzyme in a crude preparation was less sensitive to cyanide concn. (apparent K_I = 1.09 x 10 M KCN). It is proposed that haem-proteins in the crude material preferentially react with cyanide, thereby lowering its effective concn. AS

2176 Adams (JB) and Ongley (MH). The behaviour of green bean lipoxygenase on chromatography and isoelectric focusing. **Food Chemistry** 31(1); 1989; 57-71

A crude enzyme preparation was isolated from green beans (**Phaseolus vulgaris** cv. Cascade) by buffer extraction and subsequent fractionation with ammonium sulphate. The properties of lipoxygenase were investigated by three chromatographic methods: hydrophobic interaction chromatography followed by isoelectric focusing, ion-exchange and gel filtration chromatography. Three forms of the enzyme were found which could be separated by chromatography on DEAE-Trisacryl M. The major form, having an isoelectric point at pH 7 and a mol. wt. of 100 000, was hydrophobically bound to the gel. An ionic form having a higher mol. wt. than the hydrophobic form was found to be present in ammonium sulphate precipitates but not in the original extracts. A third form of the enzyme which did not bind to the DEAE-gel was also observed. Its properties were not investigated. The implications of these findings in relation to the work of others is discussed. AS

2177 Lee (CY), Smith (NL) and Hawbecker (DE). Enzyme activity and quality of frozen green beans as affected by blanching and storage. **Journal of Food Quality** 11(4); 1989; 279-287

Effects of different blanching conditions on residual enzyme activities and quality changes in green beans during frozen storage were studied. Green beans were blanched at various temp. and time combinations at both pilot plant and commercial scales. After storage at -23 C for 3, 6, 9 and 12 months they were analyzed for residual activities of catalase, lipoxygenase, polyphenoloxidase and peroxidase; changes in sensory quality as evaluated by a taste panel; and colour and firmness as measured with instruments. Most of enzymes were inactivated during normal blanching but the residual activities varied among enzymes. Beans blanched above 82 C for 3.5 min yielded higher sensory scores for the quality attributes tested than those blanched at the lower temp However, there appears to be no direct relationship between the quality attributes measured and the residual enzyme activities during 12 months storage. AS

Green peas

2178 Halpin (B), Pressey (R), Jen (J) and Mondy (N). Purification and characterization of peroxidase isoenzymes from green peas (**Pisum sativum**). **Journal of Food Science** 54(3); 1989; 644-649

Peroxidase isoenzymes were purified from green peas with ion-exchange chromatography on DEAE- and S-Sepharose. Three iosenzymes were identified, one neutral (N) and two cationic (C1, C2) N was extremely heat labile, with 50% original activity lost after heating 1.5 min at 25 C. N had Km values (pH 5.0) of 10.2 mM and 2.6 mM for guaiacol and hydrogen peroxide resp. C1 and C2 retained activity on heating at 30-70 C. C1 was able to reactivate after thermal inactivation, kM values for guaiacol/hydrogen peroxide were 10.8 mM/7.2 mM (pH 5.0) and 10.8 mM/4.3 mM (pH 6.0) for C1 and C2 resp. The three isoenzymes exhibited different peroxidase activities with different H-donors, different sensitivities to cyanide and different abilities to catalyze oxidation of indoleacetic acid. AS

Locust beans

2179 Ogbadu (LJ) and Okagbue (RN). Fermentation of African locust bean (**Farkia biglobosa**) seeds. Involvement of different species of Bacillus. **Food Microbiology** 5(4); 1988; 195-199

The sp. of **Bacillus** which appeared to be responsible for the fermentation of African locust bean seeds were found to be variable. In six separate fermentation, **B. subtilis**, **B. pumilus** and **B. licheniformis** were identified. **Bacillus subtilis** predominated in four of the fermentations and its growth appeared to be favoured by low oxygen tension. Lactic acid bacteria, **Leuconostoc** spp., which had been reported in large number and thus implicated in the fermentation by earlier workers were not observed. AS

Mung beans

2180 Kataria (A), Chauhan (BM) and Punia (D). Antinutrients and protein digestibility (in vitro) of mung bean as affected by domestic processing and cooking. **Food Chemistry** 32(1); 1989; 9-17

Domestic processing and cooking methods including soaking, ordinary and pressure cooking of soaked and unsoaked seeds and sprouting significantly lowered phytic acid, saponin and polyphenols of mung bean (**Vigna radiata** L.) seeds. Soaking for 18 h removed 30% phytic acid and extent of removal was still higher when the period of soaking was raised. Saponins and polyphenols were relatively less affected.

Loss of the antinutrients was greater when soaked instead of unsoaked seeds were cooked. Pressure cooking had a more disparaging effect than ordinary cooking. An increase in the period of pressure cooking was more effective in reducing saponins and polyphenols improved following sprouting; the longer the period of germination the greater was the reduction or the improvment. Phytic acid was reduced to a greater extent than polyphenols or saponins. Processing and cooking improved protein digestibility (in vitro) treatments including heat processing had the most marked effect. The greater the period of pressure cooking, the higher was the protein digestibility. AS

Peas

2181 Chapelle (V), Melcion (JP), Robert (P) and Bertrand (D). Application of near infrared spectroscopy to particle size analysis of a pea flour. Sciences des Aliments 9(2); 1989; 387-404

2182 Lee (HC) and Klein (BP). Evaluation of combined effects of heat treatment and antioxidant on peroxidase activity of crude extract of green peas. Food Chemistry 32(2); 1989; 151-161

The combined effects of heat treatment and antioxidant addition on residual peroxidase activity and isoenzyme patterns of green peas were compared with heat treatment alone. The changes of pea peroxidase isoenzyme patterns during heat treatment of crude extracts with and without antioxidants were observed by analytical thin-layer isoelectric focusing (pH 3.5-9.5). The detn. of peroxidase activities in the heat-treated samples was in agreement with an overall decrease in the number of isoenzyme detected by specific staining of the polyacrylamide gels. The antioxidants during heat treatment decreased the apparent number of peroxidase isoenzymes as well as the residual peroxidase activity. The antioxidants, TBHQ, BHA, BHT, and Alpha-tocopherol were tested at concn. ranging from 4 x 10^{-6} M to 1 x 10 M. AS

Southern peas

2183 Chapman (TL) and Collins (JL). An evaluation of marinated Southern peas (Vigna unguiculata). Journal of Food Science 54(3); 1989; 640-643, 719

Cooked southern peas (Vigna unguiculata) of two levels of maturities were soaked in sweet-or hot-flavoured marinades. Marinade treatments and maturity level of the peas affected most attributes tested. Treated peas had less moisture, protein and nitrogen-free extract and more fat, crude fiber, ash and caloric content than unmarinated peas. Luminosity was reduced, redness was varied and yellowness was increased by marinating. Firmness of marinated peas was increased. PER was not affected and averaged 1.83, pH was lowered from 6.6 to 3.9; acidity was raised from 0.1% to 1.9%. Neither treatment nor maturity affected the microbiological counts. Samples were scored as "like slightly". AS

Winged beans

2184 Ravindran (G), Palmer (JK) and Gajameragedara (SM). Seed polysaccharides of some winged bean varieties. Journal of Agricultural and Food Chemistry 37(2); 1989; 327-329

The seed polysaccharide comp. of 5 winged beans(**Psophocarpus tetragonolobus** L. DC) var. was investigated. Var. SLS 3, SLS 6, SLS 44, and TPT 1 contained little starch, while no starch was detected in SLS 1. Nonstarch polysaccharide yields represented 38.8, 40.4, 41.2, 37.3, and 41.6% of the defatted flour of SLS 1, SLS 3, SLS 6, SLS 44, and TPT 1, resp. The nonstarch polysaccharide fractions contained 63.2-67.5% carbohydrates, 12.8-15.2% protein, 10.4-12.1% lignin, and 3.2-4.8% ash. Galactose (44.0-54.9%) was the major sugar in all five var. Nonstarch polysaccharides also contained 5.1-6.5% arabinose; 4.3-6.5% xylose; small amounts of glucose, rhamnose, and fucose; 12.8-14.3% uronic acid; and 17.7-23.8% cellulose. The results suggest that winged bean polysaccharides are essentially nonstarch polysaccharide and are heterogeneous and insoluble. AS

Yam beans

2185 Njoku (HO), Eli (I) and Ofuya (CO). Effect of pretreatment on the cooking time of the African yam bean (Sphenostylis sternoarpa). Journal of Food Science 54(3); 1989; 758-759

The effect of soaking in tap water, 1% potash, and 4% NaCl for different periods on the cooking time of African yam bean was studied. The results showed that 12 h soaking was adequate for the beans to reach max. hydration, and that pretreatment of the beans before cooking appreciably influenced the overall cooking time. Cooking after pretreatment for 12 h in 1% potash or in 4% NaCl reduced the noraml cooking time by 50%. AS

OILSEEDS AND NUTS

Castor seeds

Ogiri

2186 Barber (L), Achinewhu (SC) and Ibiama (EA) The microbiology of ogiri production from castor seeds (Ricinus communis). Food Microbiology 5(4); 1988; 177-183

The microorganisms involved in the fermentation of castor seeds (**Ricinus communis**) by the traditional method were enumerated and isolated. The effect of using pure cultures to ferment the seeds were also investigated. Using the surface spread plate technique and plate count agar, aerobic counts obtained after seven days of fermentation was 1.7 x 10 cfu g^{-1}. Similarly anaerobic counts obtained on reinforced clostridial agar was 1.2 x 10^5 cfu g^{-1} **Bacillus** sp., **Pseudomonas** sp., **Micrococcus** sp., and **Streptococcus** sp. were isolated from fermenting castor seeds. The pH of fermentation castor seeds increased from 6.5 to 8.1 during the seven days of fermentation while the total titratable acidity decreased from 47 ml to 36 ml 0.1 N NaOH 100 g sample. The use of pure isolate to ferment the sterile seeds showed that only Bacillus sp. could ferment the seeds in pure cultures. AS

Groundnuts

2187 Chompreeda (P), Resurreccion (AVA), Hung (Y-C) and Beuchat (LR) Modelling the effect of peanut and cowpea flour supplementation on quality of Chinese-type noodles. International Journal of Food Science and Technology 23(6); 1988; 555-563

Supplementation of chinese-type noodles with as much as 15% defatted peanut flour and 8% cowpea flour would effectively increase protein content in the noodles to 21% without excessively sacrificing colour and firmness. Sensory score for firmness and yellowness of supplemented Chinese-type noodles were decreased as the level of peanut/cowpea flours increased. Computer generated response surface and contour polt interpretations revealed that upto 15% peanut flour and 8% cowpea flour supplementation will produce acceptable supplemented Chinese noodles with high protein content (21%). BV

Madhuca seeds

Madhuca seed flour

2188 Shamugasundaram (T) and Venkataraman (LV). Functional properties of defatted and detoxified madhuca (Mudhuca butyraceae seed flour. Journal of Food Science 54(2); 1989; 351-353

Fucntional properties of defatted and detoxified Madhuca (Madhuca butyraceae) seed flours were determined and compared with those of soybean flour. Soybean and detoxified Madhuca flours had higher water absorption capacities than defatted Madhuca flour. Due to the presence of saponins, the defatted Madhuca flour showed higher foaming capacity than the soybean and detoxified Madhuca flours. AS

Rapeseeds

2189 Paulson (AT) and Tung (MA). Dynamic shear and puncture probe measurements of canola protein isoalte gels. Journal of Texture Studies 19(4); 1989; 389-396

Relationships between textural measurements of canola protein isolate gels obtained by means of a puncture test and fundamental rheological properties obtained from nondestructive dynamic shear measurement with a Weissenberg Rheogoniometer were examined. The puncture force was poorly correlated with viscoelastic parameters whereas the slope of force-deformation curves to the point of ruputre was well correlated with the storage and loss moduli of the gels. The area under force-deformation curves to rupture followed a curvilinear realtionship with the loss tangent of the gels. Of the 27 gels tested, 17 were translucent and 10 were opaque. The response of translucent and opaque gels to the two type of rheological tests was not identical, which indicated that gel microstructrue is an influential factor when evaluating gel rheological properties by destructive or nondestructive methods. AS

2190 Sosulsk (FW), Gadan (HM), Essa (TA), Al-Samaraie (AM) and Hameedy (IH). Lipid composition of rapeseed and mustard genotypes in Iraq. Food Science Technology, 22(1); 1989; 29-31

When grown as winter crops in Iraq, six annual rapeseed and mustard genotypes contained significantly more oil than in the same genotypes grown in Canada but were similar in fatty acid comp. The lipids in LEAR cvs of **Brassica campestris** and **B. napus** contained 57.5 and 63.5%, resp. of oleic acids and less than 2% of erucic acid, which was below the max. for GRAS standards. The oils from the HEAR cv of **B. campestris** contained 56.5% erucic acid, which exceeded the min. standard for industrial rapeseed oils. The high oil contents in oriental and white mustards would be a degrading factor in the condiment market. AS

2191 Sukumaran (CR) and Singh (BPN). Compression of a bed of rapeseeds. The oil-point. Journal of Agricultural Engineering Research 42(2); 1989; 77-84

A method for investigating the oil-point of rapeseeds has been described. The oil-point is identified as an important bulk property of rapeseeds particularly in relation to oil expression. The oil-point is that stage in compression of an aggregation of rapeseeds at which oil exudes from the interior of the seeds to wet their surface and till interparticle voids. A 10 mm thick bed of rapeseeds was compressed. Experimental results shows for moisture contents upto 12.4% (wet basis) and rates of deformation from 5 to 19.5 mm/min the bed strains and corresponding pressures needed for a thin bed of rapeseeds to reach the oil-point range from 0.362 to 0.486, and 5.72 to 9.68 MPa resp. within the range of the present study, moisture content of the seeds had a relatively greater effect on the oil-point pressure and strain than the rate of deformation. BV

Rapeseed proteins

2192 Paulson (AT) and Tung (MA). Thermally induced gelation of succinylated canola protein isolate. Journal of Agricultural and Food Chemistry 37(2); 1989; 319-326

Thermally induced gelation of unmodified and succinylated canola protein isolate (54% and 84% modification of free amino groups) was examined over a wide range of NaCl concn. (0.0-0.7 M) and pH (3.5-11.0). Protein dispersions were heated at 72 C for 30 min to simulate cooking conditions for a comminuted meat product. Succinylation improved gelation. For unmodified isolate, gels formed at only 4 of 18 combinations of pH and NaCl, while 12 gels formed from each level of succinylation under same conditions. Gels from unmodified isolate formed only at high pH (greater than or equal to 9.5) whereas those from succinylated isolate formed from pH 5.0 to 11.0. Above pH 6.5, succinylated protein formed gels only in the presence of NaCl. In general, the firmest gels were obtained with moderate succinylation. All gels from unmodified isolate and those at pH 5.0 from succinylated isolate formed opaque gels due to the presence of insoluble particulates; all others were translucent. Translucent and opaque gels respond differently to rheological tests and were related in different ways to physicochemical and rheological properties of protein dispersions. Bonds involved in gel formation and stability were tentatively identified as hydrophobic interactions and hydrogen bonds. AS

Safflower seeds

2193 Salazar Zazueta (AJ) and Price (RL). Solubility and electrophoretic properties of processed safflower seed (Carthamus tinctorius L.) proteins. Journal of Agricultural and Food Chemistry 37(2); 1989; 308-312

Whole safflower seeds (Carthamus tinctorius L.) cvs Kino '76, with a crude protein content of 17.3% (dry-wt. basis) were subjected to the processes of cracking, defatting (n-hexane extraction), dehulling, debittering (70% methanol extraction), and grinding to meals to study the solubility and electrophoretic behaviour of their proteins. Sequential extraction of defatted, whole-meal protein fractions showed that water-, salt , and alkali-extractable protein fractions and residue (unextraced, protein) accounted for 7.0, 5.0, 69.0, and 9.0%, resp. The 70% alcohol solvent extracted negligible amounts of protein. SDS-PAGE of the water-, salt- and alkali- extractable protein fractions showed 8, 13, and 13 distinctive subunits resp., with mol. masses ranging from 14.7 to 88.0 kDa. After dehulling and debittering, the amount of alkali-extractable protein fraction decreased significantly as the residue fraction increased. Quantitative and qualitative changes in the mol. wt. and subunit comp. of SDS-PAGE patterns of each extracted protein fractions were observed. AS

Soybeans

2194 Chang (KC), Skauge (CH) and Satterlee (LD). Analysis of amino acids in soy isolates and navy beans using precolumn derivatization with phenylisothiocyanate and reversed phase high performance liquid chromatography. Journal of Food Science 54(3); 1989; 756-757, 759

Amino acid analysis of three legume samples using precolumn phenylisothiocyanate (PITC) derivatization and reversed-phase high performance liquid chromatography (RP-HPLC) was compared with literature data or that obtained by the conventional ion-exchange chromatographic (IEC) method. The results indicated that the amino acid profiles obtained by PITC derivatization and RP-HPLC compared fairly well with literature data for soy isolates, and fairly with that obtained by the IEC method for navy beans. Av. coeff. of variability of all amino acids determined by the PITC method was 6%. It was not essential to remove lipids (2.1%) in navy beans prior to acid hydrolysis and PITC derivatization for the analysis of amino acids. AS

2195 Gordon (MH) and Barimalaa (IS). Co-oxidation of fat-soluble vitamins by soybean lipoxygenase. Food Chemistry 32(1); 1989; 31-37

Lipoxygenase-catalysed oxidation of linoleic acid can be accompanied by considerable losses of fat-soluble vitamins. Vitamins A D , D_3 and E are all susceptible to rapid co-oxidation at neutral pH in the presence of soybean lipoxygenase. Retinol appears to be more stable towards co-oxidation than retinol, which is similar in stability to Beta-carotene. It is concluded that extensive conjugation is not required for co-oxidation of lipids, but the nature of polar substituents may have a significant effect on the rate of co-oxidation. AS

2196 Katiyar (SK) Kumari (K) and Bhatia (AK). Nutrient composition of 'Nikku muth a traditional soybean cultivar of Kashmir Valley, with particular reference to content of lipids and proteins. Food Chemistry 32(2); 1989; 117-123

Nikku muth a traditional soybean cv of Kashmir valley, is a nutritive legume, containing 302 g protein, 185 g lipid and 355 g digestible carbohydrates per Kg of seed. Among the simple proteins glutelin is the major fraction (91 g/kg) while prolamin constitutes the least (3 g/kg). The oil contains linoleic acid (46.3%) and oleic acid (23.2%) as the major fatty acids whereas myristic (1.5%), palmitic (13.5%), stearic (6.1%) and linolenic (9.4%) acids are in lesser concn. The phospholipid fraction which constitutes 10.5% of the oil, also contains linoleic (51.4%) and oleic (21.2%) acids as the major fatty acids. Among the phosphatides, phosphatidyl choline and phosphatidyl ethanolamine constitute 0.83 g and 0.78 g per 100 g of the seed resp., while phosphatidyl serine and phosphatidyl inositol constitute 0.09 g and 0.24 g per 100 g of the seed, resp. AS

2197 Mori (T), Mohrit (M), Artik (N) and Matsumura (Y). Rheological properties of heat-induced gel of soybean 11S globulin under high ionic strength (MU = 0.5). Journal of Texture Studies 19(4); 1989; 361-371

Rheological properties of gels, prepared by heating 10% 11S globulin solution at 100 C under high ionic strength (MU = 0.5) were investigated by measuring the gels at 20 C and 4 C. According to the difference of heating time, rheological properties of gels changed significantly. Gel hardness increased with the heating time and then reached a plateau at 15 min. Creep curve forms of the gels were basically similar among all the heating times. Viscoelastic parameters of the gels, which were calculated from creep curves on the basis of six elements model, increased with heating time except the retardation times of Voigt body. The gels formed by heating for 15 and 20 min exhibited similar gel hardness but different values of each viscoelastic parameter. The difference of measuring temp. caused no significant change in gel hardness, form a creep curve and viscoelastic parameters. The relation of the rheological properties to fine structure of the gel and intermolecular bondings within the gel, is discussed. AS

2198 Tanteeratarm (K), Wei (LS) and Steinberg (MP). Effect of soybean maturity on storage stability and process quality. Journal of Food Science 54(3); 1989; 593-597

Hack and Williams 82 soybeans from four maturation stages were studied for storage stability and process quality. As compared to mature beans, trypsin inhibitor, urease and lipoxygenase (LA) activities were lower in immature seeds, but free fatty acid (FFA) was higher and oil was greener. During storage for six months, LA decreased and FFA increased at a faster rate in immature than in mature soybeans. Crude oil and protein contents were similar, regardless of maturation or storage time. Both 7S and 11S proteins increased with maturation but the WS/11S ratio decreased. There was no change in protein during storage. AS

Soy products

2199 Dipietro (CM) and Crener (IE). Soybean protease inhibitors in foods. Journal of Food Science 54(3); 1989; 606-609, 617

The major types of soybean protease inhibitors are the Kunitz inhibitor (KSTI) and the Bowman-Birk inhibitor (BBI). Enzymatic analysis and rocket immunoelectrophoresis were used to specifically quantitate the amounts of KSTI and BBI in various soy foods. Many soy products such as soy flours, soy conc. and soy isolates contained significant amounts of KSTI and BBI. Some soy foods contained small but still detectable levels of KSTI and BBI. AS

Soy milk

2200 Matsuura (M), Obata (A) and Fukushima (D). Objectionable flavour of soy milk developed during the soaking of soybeans and its control. Journal of Food Science 54(3); 1989; 602-605

Daidzein and genistein, which are responsible for the objectionable flavour of soy milk, increased during the soaking of soybeans, the first step of soy milk manufacturing. The max. production of these isoflavone compounds occurred at 50 C and pH 6.0 depending upon the temp. and pH of the soaking water. The production of these substances was strongly inhibited by glucono-Delta-lactone which was a competitive inhibitor of Beta-glucosidases. It would, appear, therefore, that Beta-glucosidases were responsbile for the production of daidzein and genistein during soaking. AS

Soy proteins

2201 Champagne (ET) and Phillippy (BQ). Effects of pH on calcium, zinc, and phytate solubilities and complexes following in vitro digestions of soy protein isolate. Journal of Food Science 54(3); 1989; 587-592

High intraluminal gastric pH values in young infants could affect the bioavailability of Zn in soy protein isolate formula. This investigation examined the effects of pH on the solubilities and complexes of Ca, Zn, and phytate following in vitro pepsin and pepsin-pancreatin digestions of soy protein isolate. The results of these in vitro studies suggested that (1) high intraluminal gastric pH values could lead to the formation of insoluble Ca-Zn-phytate complexes in the stomach following ingestion of soy protein isolate and (2) high intraluminal gastric pH values would only affect resultant soy-Zn solubility in the small intestine in the absence of exogenous Ca and Zn but not in the presence of same. AS

2202 Hamada (JS) and Marshall (WE). Preparation and functional properties of enzymatically deamidated soy proteins. Journal of Food Science 54(3); 1989; 598-601, 635

Heat-denatured soy protein was hydrolyzed by Alcalase to 2.0% or 4.0% degree of hydrolysis (DH), heated again at 100 C and deamidated with Bacillus circulans peptidoglutaminase. The extent of deamidation was 6.0% and 8.2% for 2.0 DH hydrolysates and 12.8% and 16.0% for 4.0 DH hydrolysates heated for 15 and 30 min, resp. Deamidation increased protein solubility and substantially enhanced emulsifying activity under mildly acidic (pH-4-6) as well as alkaline conditions. Deamidation improved emulsion stability and foaming power of heat-denatured hydrolysed soy proteins. Enzymatically deamidated soy protein hydrolysates had improved functional properties compared to nondeamidated hydrolysates and the native soy protein. AS

2203 Trank (SJ), Johnson (DW) and Cussler (EL). Isolated soy protein production using temperature sensitive gels. Food Technology 43(6); 1989; 78-83

A new method for manufacturing soy protein isolate reportedly recovers essentially all of the protein, removes undesirable component, and has improved nutritional and functional qualities. AS

2204 Ventling (BL) and Hurley (WL). Soy proteins in milk replacers identified by immunoblotting. Journal of Food Science 54(3); 1989; 766-767

A method was developed for detecting soy proteins in milk replacers and infant formulas. The method is based upon polyacrylamide gel electrophoresis of proteins, electrobloting the proteins to nitrocellulose, and detection of specific proteins by immunoblotting. As little as 25 ng of total soy protein per gel lane can be detected with this method. Proteins from other plant products were detected by the method but care must be used in comparing milk replacer proteins directly to soy proteins. This method should be of value to the animal and food industries that manufacture and use milk replacers. AS

Sunflowers

2205 Thibault (JF), Crepeau (M-J) and Quemener (B). Carbohydrates of sunflower and rapeseed. Sciences des Aliments 9(2); 1989; 405-412 (Fr).

Two cvs of sunflower (Helianthus annuus L.; Cargisol and Rodeo cvs.) and of rapeseed (Brassica napus L. Darmor and 8002 cvs.) seeds were separated into full and cotyledons and separately analysed for their carbohydrate contents after extraction with a chloroform/methanol mixture. The variety had not a profound infleunce on the carbohydrate comp. The hulls of sunflower (-25.30% of the wt. of the seed) were poor in ethanol soluble carbohydrates and rich (-50%) in polsaccharides mainly composed of xylose (14-16%) glucose (19-20%) and galacturonic acid (9-10%). The dehulled seed contained 1.2% of ethanol-soluble products, including 0.7% of sucrose, 0.4% of raffinose and 0.1% of stachyose. The polysaccharides (4.8%) were mainly composed of galacturnoic acid (1%), glucose (1.1%) and arabinose (1.3%). Rapeseed was characterized by a lower hull fraction (15-16%) which was rich in galacturonic acid (11-12%), glucose (7-8%) and arabinose (6-7%). The cotyledons were richer in ethanol-soluble carbohydrates (2-3% sucrose, 3% stachyose) and richer in polysaccharides composed of glucose (1.8-1.9%), arabinose (1.7-1.9%) and galacturonic acid (1.3-1.5%). AS

TUBERS AND VEGETABLES

Root vegetables

2206 Chandra (S). Tropical root crops and their potential for food in the less developed countries. Food Reviews International 2(2); 1986; 143-169

Review. 38 references. BV

Carrots

2207 Carlin (F), Nguyen-The (C), Cudennec (P) and Reiche (M). Microbiological spoilage of fresh, ready-to-use grated carrots. Sciences des Aliments 9(2); 1989; 371-386

2208 Mudahar (GS), Toledo (RT), Floros (JD) and Jen (JJ). Optimization of carrot dehydration process using response surface methodology. Journal of Food Science 54(3); 1989; 714-719

The effect of temp. and time in a fluidized bed dryer, the concn. of biopolymeric treatment and blanching time on quality attributes of dehydrated carrots was evaluated by response surface methodology. Optimization maximized rehydration ratio and minimized bulk density and carotene loss. Based on surface responses and contour plots, optimum conditions were: drying temp. of 150 C, exposure time of 12.5 min., biopolymer concn. of 1.40%, and blanching time of 12 min. Experimentally determined values for rehydration ratio, bulk density, and carotene loss in product processed under the optimum conditions were very close to the predicted values of 9.5, 0.05, and 15.7%, resp. AS

Cassava starch

2209 Jamuna (R) and Venkata Ramakrishna (S). SCP production and removal of organic load from cassava starch industry waste by yeasts. **Journal of Fermentation Technology '(Hokko Kogaku Zasshi')** 67(2); 1989; 126-131

In this paper the studies are carried out to evaluate the efficiency of yeast cultures in treating the cassava starch factory waste water in the removal of chemical oxygen demand(COD) and the attainment of single cell protein(SCP) as an incentive. When a few selected strains of yeasts were analysed for SCP production based on the criteria of best biomass yield and high reduction in COD. The results showed that performance of cocultures have improved in COD removal of the waste water and % increase of protein and coculturing was more effective in a lab. fermentor under controlled conditions. NGKR

Horseradish

2210 Korb (KA) and Chism (GW). A rapid method for determining allylisothiocyanate in horseradish containing products. **Journal of Food Science** 54(3); 1989; 778-779

A rapid method for determining allylisothiocyanate (AITC) in horseradish-containing products was developed. Headspace samples were analyzed by gas chromatography and the AITC peak identity was confirmed by mass spectrometry. The coeff. of variation was less than 4%. Recovery of added AITC from commercial ground horseradish products averaged 91% for six different samples. Recovery of added AITC from a tomato-based sauce containing horseradish oil averaged 94% for seven samples. The slopes of the standard curves for AITC were dependent upon the sample matrix with the slope for AITC in oil less than 5% of that for AITC in water. AS

Tubers

Potatoes

2211 Desjardins (AE) and Plattner (RD). Trichothecene toxin production by strains of **Gibberella pulicaris** (**Fusarium sambucinum**) in liquid culture and in potato tubers. **Journal of Agricultural and Food Chemistry** 37(2); 1989; 388-392

Fifteen strains of **Gibberella pulicaris** (asexual stage: **Fusarium sambucinum** or **Fusarium sulphureum**) isolated from dry-rotted potato (**Solanum tuberosum**) tubers were tested for trichothecene toxin production in liquid culture and in potato tubers, for pathogenicity on potato tubers, and for ability to form sexual crosses. Fourteen strains were sexually fertile and accumulated 4,15-diacetoxyscirpenol in liquid culture (up to 47 µ g of toxin/mg dry wt. fungal mass). Most strains were able to rot tuber slices of potato cultivar 'Russet Burbank' and produced 15-monoacetoxyscirpenol and 4,15-diacetoxyscirpenol as well as other minor trichothecenes in infected tubers (up to 5 µ g of toxin/g rot fresh wt.). These results indicate that production of trichothecene toxins is a common trait of G. pulicaris strains isolated from potato tuber dry-rot and that trichothecenes may occur in potatoes naturally infected with this fungus in the field or in storage. AS

Potatoes

2212 Gosselin (B), Mondy NI). Effect of packaging materials on the chemical composition of potatoes. Journal of Food Science 54(3); 1989; 629-631

Potatoes(`Russet Burbank' and `Chieftain') packed in either mesh, paper or polyethylene bags and compared for chemical comp. after 1, 4, and 8 wks of storage at 20 C., were analyzed for wt. loss, discolouration, phenols, ascorbic acid, glycoalkaloids and nitrate-N. Potatoes packaged in polyethylene were lowest in wt. loss, ascorbic acid and nitrate-N and highest in discolouration, phenols and glycoalkaloids than those packaged in mesh or paper. Potatoes packed in paper were lowest in discolouration and phenols and highest in ascorbic acid. There were no significant differences in wt. loss, glycoalkaloids or nitrate-N between potatoes packed in mesh or paper. AS

2213 Lilja (M) and Lingnert (H). Lipid changes during the production of potato granules. Food Chemistry 31(4); 1989; 267-277

Potato granules were produced by an add-back-process. The lipid comp. of the potato tubers and the final potato granules were assessed in order to study the influence of the process. The extracted lipids were fractionated into three major classes, neutral lipids, galactolipids and phospholipids, on a silicic acid column. The free fatty acids were separated from the neutral lipids by high performance liquid chromatography (HPLC). The fatty acid comp. of the three lipid classes as well as the free fatty acid fraction was analysed by GC. No changes could be observed in the galactolipids and the phospholipids but the free fatty acid content was found to be about ten times higher in potato granules than in the potato tubers. AS

Sweet potatoes

2214 Oboh (S), Ologhobo (A) and Tewe (O). Some aspects of the biochemistry and nutritional value of the sweet potato (Ipomea batatas). Food Chemistry 31(1); 1989; 9-18

Forty-nine var. of sweet potato (Ipomea batatas) were analysed for their proximate chemical comp., gross energy values and levels of antinutritional factors. Results obtained showed marked varietal differences. among the different sweet potato tubers. This is indicated by the high percentage coeff. of variation obtained and the rather wide range of values between var. Notably, crude protein ranged between 1.39% and 9.4%, ether extract between 0.38% and 3.03%, and crude fibre between 3.84% and 5.89%. Gross energy levels in the tubers were generally high and values obtained ranged from 11.85 for TIS 8266 to 23.29KJ/g dry matter for TIS 8163. The antinutritional factors detected in the sweet potato var. included phytates, oxalates and tannins. Mean values obtained were 9.93 mg/100 g for phytate, 2.79 mg/100 g for phytate-phosphorus, 0.71% for tannins, 0.45% for water-soluble oxalate and 0.71% for total oxalate. The nutritional implications of these findings are discussed. AS

Vegetables

2215 Buick RK) and Damoglou (AP). Effect of modified atmosphere packaging on the microbial development and visible shelf life of a mayonnaise-based vegetable salad. Journal of the Science of Food and Agriculture 46(3); 1989; 339-347

The effect of a modified atm. of 20% carbon dioxide, 80% N on the microbial development and visual shelf life of a mayonnaise-based vegetable salad is reported. The modified atm. delayed the spoilage of the salad at all three chose storage temp. The principal organisms causing spoilage of the salads were yeasts, those spoiling the midified atm. packs having a fermentative ability. Modified atm. packaging of the vegetable salad would allow the manufacturer to increase the shelf life of the product form 40 to 54 days at 4 C storage, 12 to 22 days at 10 C storage, and 5 to 12 days at 15 C storage. AS

2216 Okoli (EC), Nmorka (OG) and Unaegbu (ME). Blaching and storage of some Nigerian vegetables. International Journal of Food Science and Technology 23(6); 1988; 639-641

Brassica

2217 Mossoba (MM), John Shaw (G), Andrzekewski (D), Sphon (JA) and Page (SW). Application of gas chromatography matrix isolation/Fourier transform infrared spectrometry to the identification of glucosinolates from Brassica vegetables. Journal of Agricultural and Food Chemistry 37(2); 1989; 367-372

There is limited epidemiologic evidence suggesting that ingestion of Brassica vegetables may be associated with reduced risk of some cancers of the alimentary tract, and a number of Brassica constituents are known to inhibit carcinogenesis in lab. animals. The components that are responsible for the observed protective activity and the effects of processing on them have not yet been established. An analytical method using capillary gas chromatography/matrix isolation/Fourier transform infrared spectroscopy (GC/MI/FT-IR) has been developed for characterizing a series of intact glucosinolates extracted from Brussels sprouts and rutabaga (swede). Highly resolved gas chromatograms and diagnostic MI/FT-IR spectra were obtained for different glucosinolate analogues with subtle structural differences. AS

Cauliflowers

2218 Baardseth (P) and Naesset (E). The effect of lipid-degrading enzyme activities on quality of blanched and unblanched frozen stored cauliflower estimated by sensory and instrumental analysis. Food Chemistry 32(1); 1989; 39-46

Three var. of cauliflower were blanched as florets, frozen and stored at -20 C for 8 months. Unblanched cauliflower florets were used as a reference. Blanching completely inactivated peroxidase, palmitoyl-CoA hydrolase and Alpha oxidation, while residual activity was found for acylhydrolase, lipoxygenase and catalase. Protein content was reduced with increased blanching time. Unblanched cauliflower was inedible and sensorially unacceptable after 4 wks of storage at -20 C. The heat treated samples also developed off-flavours and off-odours, but to a lesser extent. Significant correlations between sensory and colour analysis were obtained. AS

Cucumbers

2219 Fleming (HP), Daeschel (MA), McFeeters (RF) and Pierson (MD). Butyric acid spoilage of fermented cucumbers. Journal of Food Science 54(3); 1989; 636-639

Small cucumbers brined to equalize at 2.3% NaCl in an anaerobic tank underwent a normal primary lactic acid fermentation that resulted in 1.09% titratable acidity (as lactic) and pH 3.7. Nine months later the product was observed to have spoiled, as evidenced by an unpleasant odour. Products formed during spoilage in order of concn. were acetic acid > butyric acid > n-propanol > propionic acid. No lactic acid remained. No botulinal toxin was detected. Clostridium tertium was identified as contributing to the spoilage, but did not produce propionic acid or n-propanol under test conditions. Evidence indicated that unidentified bacteria, possible propionibacteria sp., degraded lactic acid causing a rise in pH which allowed C. tertium to grow. AS

Leafy vegetables

Amaranthus

2220 Paredes-Lopez (O) and Mora-Escobedo (R). Germination of amaranth seeds. Effects on nutrient composition and colour. Journal of Food Science 54(3); 1989; 761-762

Amaranth seeds were germinated at a water activity of about 0.92 for up to 72 h. Crude protein, true protein and crude fiber were found to increase and fat content to decrease. For 48 h of germination reactive lysine values did not change. At 72 h a slight decrease was observed in lysine and in vitro protein digestibility was similar to the control. During germination Hunter colour parameters L were lowered and a and b were enhanced. Germinated seeds showed a pinky colour which appeared very attractive for various food uses. AS

Cabbages

2221 Wang (CY). Changes of polyamine content on Chinese cabbage during storage in air or low oxygen atmosphere. Journal of Food Quality 11(4); 1989; 289-302

Endogenous levels of polyamines, including putrescine, spermidine, and spermine, were determined in the outer laminae, outer midribs, inner laminae, and inner midribs of Chinese cabbage (Brassica campestris L. Pekinensis group) during storage at 0 C in air or in 1% oxygen atm. In the outer laminae where tissues were more mature, polyamines declined linearly with storage at 0 C. The content declined more slowly in low oxygen-stored samples than in air-stored samples. In the inner laminae where tissues were still meristematic, polyamines in both air and low oxygen-stored samples showed a quadratic response and increased during the first 6 wks of storage. Thereafter, the level of polyamines decreased under both treatments, but a higher level was maintained in the low oxygen-stored samples. AS

Cantaloupes

2222 Dull (GG), Birth (GS), Smith (DA) and Leffler (RG). Near infrared analysis of soluble solids in intact cantaloupe. **Journal of Food Science** 54(2); 1989; 393-395

A nondestructive method is presented for the detn. of soluble solids in `Saticoy' cantaloupe (Cucumis melo var. reticulatus Naud.). Near infrared (NIR) spectrophotometry in the wavelength region of 800 to 1000 nm was used to analyze radiation which had interacted with cantaloupe flesh. The feasibility of the method was established using cantaloupe tissue slices, and the method was then extended to intact cantaloupe. The method uses calculated parameters from the spectral data, namely second derivatives determined at two distinct wavelengths, and correlates their ratio with soluble solids. Using tissue slices the correlation coeff. (r) was -0.97 with standard error to calibration (SEC) of 0.56. The corresponding values for intact fruit were -0.60 and 1.67, resp. AS

Tomatoes

2223 Adegoroye (AS) and Eniayeju (DE). Influence of container material and shape on impact-induced damage of tomatoes in transit. **International Journal of Food Science and Technology** 23(6); 1988; 633-637

Basket material and shape are important factors in minimizing impact damage to baskets of tomato fruits. Frounds have advantages over high tensile and compressive strength materials. The trapezoid shaped and traditional open-U-shaped market types are better than the U or ellipsoid shapes in reducing produced damage. In the postharvest distribution, system, resistance to side-ways compression and stackability are as important as impact protection, the trapezoid baskets appear to be better than the open-U-shaped market type. BV

2224 Lazos (ES) and Kalathenos (P). Composition of tomato processing wastes. **International Journal of Food Science and Technology** 23(6); 1988; 649-652

Tomato pomace, a waste product from tomato processing plants utilization of which could provide extra income and at the same tim reduce a waste disposal problem. Tomato processing wastes are rich in nutrients and could be utilized successfully as a source of protein conc. (seed proteins) and of edible oil for human consumption as well as for feed. Crude fibre could be used as a source of dietary fibre. BV

FRUITS

2225 Kozempel (MF), Sullivan (JF), Craig (JCJR) and Konstance (RP). Explosion puffing of fruits and vegetables. Journal of Food Science 54(3); 1989; 772-773

Explosion puffing is a processing system which facilitates hot air drying of fruits and vegetables. Explosion puffed foods are easily rehydrated and have excellent sensory properties. The process costs are similar to the cost of conventional hot air drying. Previous publications have reported the results relevant to carrots, potatoes, apples and blueberries. Sufficient research has been done on other fruits and vegetables to establish that they too, can be satisfactorily explosion puffed and dried to yield a good products. The processing conditions for explosion puffing of mushrooms, celery, onions, peppers, rutabagas, beets, yams, pears, pineapples, strawberries, and cranberries are presented. AS

2226 Sharaf (A), Ahmed (FA) and El-Saadany (SS). Biochemical changes in some fruits at different ripening stages. Food Chemistry 31(1); 1989; 19-28

Soluble and insoluble proteins were decreased gradually in apricot whereas in mango the soluble protein increased and insoluble protein decreased during ripening. Fourteen amino acids could be detected in apricot and twelve in mango, and the percentage of each varied according to the degree of ripening. Total and soluble carbohydrate were increased gradually in both apricot and mango fruits. Glucose, fructose and sucrose were determined in both fruits at all ripening stages, while xylose was found only in apricot. Certain volatile components were separated and identified in apricot, including aromatic aldehydes, esters, alcohols and ketones, while in mango thirty volatile components were identified, including cis-ocimene, myrcene, limonene, esters, aldehydes and terpenes. Mango juice contained palmitic and oleic acids as major constituent fatty acids while the short chain fatty acids represented only 5% at the green mature stage and were decreased at other ripening stages. In apricot juice, myristic and oleic acids were the most abundant fatty acids, while the saturated short chain fatty acids comprised only 7% of the total fatty acids and decreased at the ripe and overripe stages. AS

Apples

2227 Cano (MP), De la Plaza (JL) and Munoz-Delgado (L). Effects of several postharvest fungicide treatments on the quality and ripeness of cold-stored apples. **Journal of Agricultural and Food Chemistry** 37(2); 1989; 330-333

Benzimidazole fungicides and imazalil applied in postharvest treatments to apples (**Malus domestica** L.) var. 'Starking' and 'Golden Delicious') for the control of the most important postharvest diseases in pome fruit during cold storage caused small but statistically significant ($p = 0.01$) changes in total acidity and total sugar comp. of both cvs. No significant differences in firmness were observed in treated fruits relative to the untreated apples of the same cvs and an important improvement in their ripening was also detected. The ascorbic acid content of treated fruits was significantly higher than the corresponding values of untreated fruits during all storage times. AS

2228 Castaldo (D), Quagliuolo (L), Servillo (L), Balestrieri (C) and Giovane (A). Isolation and characterization of pectin methylesterase from apple fruit. **Journal of Food Science** 54(3); 1989; 653-655, 673

Two forms of the enzyme pectin methylesterase are evidenced in the apple (**Malus communis**). They differ both in their charge and mol. wt. The two enzymes were separated by DEAE-cellulose chromatography. Their mol. wt., determined by gel-filtration, were 55000 and 28000 daltons. The heavier form has been purified at homogeneity and subjected to investigations regarding its activity as a function of the pH and temp., and detn. of its kinetic parameters. The enzyme has a Km value of 1.05 mg/mL for citrus pectin and an optimum activity in the pH range between 6.5-7.5. The enzyme was stable up to 40 C. Incubation for 1 min at 90 C leads to its complete inactivation. AS

2229 Hatfield (SGS) and Knee (M). Effects of water loss on apples in storage. **International Journal of Food Science and Technology** 23(6); 1988; 575-583

Cox's apples were stored for up to 6 months in the presence or absence of anhydrous CaCl in an atm. containing 2% oxygen and < 1% carbon dioxide at 3.5 C, and effects on the physical properties of the fruit were assessed for up to 6 months. The desiccant was used to obtain an initial water loss of about 5% of fruit wt. in the first 30 days of storage. In control fruit, turgor pressure appeared to be maintained during storage, and first vol. increased as the air space in the fruit tissue increased. Intital wt. loss lowered turgor pressure and prevented this increase. The force required to disrupt slices of apple in the Kramer shear cell was usually higher after initial wt. loss, but resistance to the conventional penetrometer was little affected. Initial wt. loss led to higher levels of soluble pectin and higher resistance to gaseous diffusion. In sensory tests are high wt.-loss fruit was firmer, tougher and less mealy than control fruit. AS

2230 Tscheuschner (H-D) and Du (D). Modelling of mechanical properties of apple flesh under compressive load. Journal of Food Engineering 8(3); 1988; 173-186

Compressive tests with various constant loads and subsequent unloading by means of modified penetrometer measurements of deformation kinetics are performed on cylindrical apple flesh specimens. The measurements are taken at a var. of loads and analysed by means of a mechanical model, the constitutional equation of which is described. Thus, a complete mechanical model for the deformation behaviour of apple flesh is developed and checked. The mechanical model derived suitably describes the deformation behaviour of apple flesh within a wide range of loads. AS

Citrus fruits

2231 Houck (LG) and Mackey (BE). Permeability of flexible polymer films used to wrap citrus fruit to the fumigants ethylene dibromide and methyl bromide. Journal of the American Society for Horticultural Science 114(1); 1989; 86-90

The postharvest behaviour of watermelon (Citrullus lanatus (Thunb.) Matsum and Nakai) fruit harvested at selected stages of development and stored in air or exposed to 50 u l ethylene/liter or 6500 u l propylene/liter was investigated. Characteristics measured included the effects of propylene on ripening, respiration, ethylene production, and fruit firmness. Ethylene treatment induced a rapid deterioration of fruit at all maturation stages, as evidenced by the acute placental tissue softening and water soaking. Melons of all maturation stages held in air showed little textural change throughout storage and produced only trace quantities of ethylene. Respiratory activity of fruits at each maturation stage was enhanced in the presence of ethylene or propylene and returned to normal rates upon removal of the gases. Ethylene production was not initiated by exposure of fruit to propylene, and was detected only in fruit exhibiting symptoms of decay. The results support the conclusion that watermelon fruit exhibit a nonclimacteric pattern of ripening. AS

Grapes

Grape preserves

2232 Splittstoesser (DF), Lammers (JM), Downing (DL) and Churey (JJ). Heat resistance of Eurotium herbariorum, a xerophillic mold. Journal of Food Science 54(3); 1989; 683-685

Eurotium haerbariorum, isolated from a spoilage outbreak involving grape preserves, was a true osmophile in that optimal growth was obtained in media containing 40-60% sucrose. Survival curves showed logarithmic death of heated spores followed by a tailing. In 5 C Brix grape juice D-values at 70 C and z-values were 2.5 min and 9.1 C compared to 5.2 min and 7.1 C in 65 C Brix juices. Low concn. of sorbic acid and fumaric acid in the heating menstruum had little effect on heat resistance. AS

Kiwifruits

2233 Prestamo (G). Peroxidase of kiwifruit. Journal of Food Science 54(3); 1989; 760, 762

Peroxidase from kiwifruit (Actinidia chinensis) was extracted, precipitated with ammonium sulphate, and purified by DEAE-cellulose chromatography. Only one band with peroxidase activity with an estimated mol. wt. of 40,00-42,000 daltons was found by sodium dodecyl sulphate-polyacrylamide gel electrophoresis. AS

Mangoes

2234 Sharp (JL). Hot-water immersion appliance for quarantine research. Journal of Economic Entomology 82(1); 1989; 189-192

A hot water immersion appliance (HWIA) was assembled and used as a research tool in the development of a hot-water immersion quarantine treatment to disinfest mangos in Haiti, Mexico, and Florida that were infested with immature Tephritidae. The HWIA consists of a metal container (approx. 57.2 cm inside diameter and 85.1 cm height) adapted with a metal screen platform positioned inside the container 25.4 cm above the bottom. A submersible pump mounted to the bottom of the platform circulated 1,514-1,893 liters heated water per hour within the container through flexible polybutylene tubing. The water was heated by flames provided by a two-burner, propane gas, hot plate located below the container. The HWIA was easily assembled, durable, mobile, and inexpensive. AS

2235 Sharp (JL), Ouye (MT), Hart (W), Ingle (S), Hallman (G), Gould (W) and Chew (V). Immersion of Florida mangoes in hot water as a quarantine treatment for Caribbean fruit fly (Diptera:Tephritidae). Journal of Economic Entomology 82(1); 1989; 186-188

Heated water was tested as a quarantine treatment to destroy all instars of the Caribbean fruit fly, Anastrepha suspensa (Loew), in mangoes, Mangifera indica L., from Florida. Infested 'Tommy Atkins' and 'Keitt' were immersed for 20-60 min in water at 46.1-46.7 C. Probit analysis of the data estimated the immersion time required to reach 99.9968% mortality (Probit 9 security) as 60 and 60.5 min for 'Tommy Atkins' and 'Keitt' resp. A large-scale test resulted in zero survivours based on the number of normal appearing pupae when 116,031 A. suspensa larvae in 3,828 infested 'Tommy Atkins' 'Keitt' 'Jubilee' and 'Kent' were immersed in water at 46.1-46.7 C for 90 min. AS

Olives

2236 Drusas (A), Vagenas (GK) and Saravacos (GD). Diffusion of sodium chloride in green olives. Journal of Food Engineering 7(3); 1988; 211-222

The diffusivity of sodium chloride in green olives was investigated in lab. exp. The olives were immersed in brines of limited vol. and salt absorption was measured from changes in brine concn. The salt diffusivity was determined by a numerical method of non-linear regression analysis. Low salt diffusivity values, ranging from 3.2×10^{-11} to 4.3×10^{-11} m s^{-1}, with a mean value of 3.8×10^{-11} m^2 s^{-1}, were obtained, due to the high resistance to mass transfer of the olive skin and flesh. Pretreatment of the olives in 1.8% sodium hydroxide solution, used to remove the bitter component oleuropein, has the added advantage of increasing the salt diffusivity almost 5-fold. AS

Pears

2237 Rosen (JC) and Kader (AA). Postharvest physiology and quality maintenance of sliced pear and strawberry fruits. **Journal of Food Science** 54(3); 1989; 656-659

Sliced strawberries (cvs. 'Pajaro' and 'G-3') and partially ripe pears (cv. 'Bartlett') were dipped in various solutions (citric acid, ascorbic acid, and/or CaCl) and stored in air or in controlled atm. (CA) for 7 days at 2.5 C followed by one day at 20 C. Fruit slices respired at a higher rate than whole fruits at both temp. CA storage suppressed respiration and ethylene production rates of sliced fruits. Firmness of strawberry and pear slices was maintained by storage in air + 12% carbon dioxide and in a 0.5% oxygen atm. resp., or by dipping in 1% CaCl. These treatments also resulted in lighter coloured pear slices than the air control treatment. AS

Rosa

2238 Razungles (A), Oszmianski (J) and Sapis (J-C). Determination of carotenoids in fruits of rosa sp. (**Rosa canina** and **Rosa rugosa**) and of chokeberry (**Aronia melanocarpa**). **Journal of Food Science** 54(3); 1989; 774-775

Carotenoid composition of fruits of two Rosa sp. (**Rosa canina** and **Rosa rugosa**) and of chokeberry (**Aronia melanocarpe**) was studied by high performance liquid chromatography. Nine carotenoids were determined: three carotenes (lycopene, Zeta-carotene, Beta-carotene) and six xanthophylls (neoxanthin, trans-violaxanthin, cis-violaxanthin, 5,6-epoxylutein, lutein, Beta-cryptoxanthin). This high number of compounds classified these fruits among those with the greatest var. of carotenoid pigments. Quantitatively large differences occurred in the carotenoid composition of the three fruits. Rosa hips contained the highest concn. of total carotenoids, which were mainly comprised of lycopene and Beta-carotene. Conversely, total xanthophylls were low. In contrast to Rosa, fruits of Aronia were lower in total carotenoids while xanthophylls composed a higher proportion. AS

CONFECTIONERY, STARCH AND SUGAR

2239 Hashimoto (K), Adachi (S), Shirai (Y) and Horie (M). Continuous separation of alpha-cyclodextrin and glucose using a simulated moving-bed adsorber. **Journal of Food Engineering** 8(3); 1988; 187-200

Alpha-cyclodextrin and glucose were continuously separated by a simulated moving-bed adsorber made up of four or 12 columns packed with the sodium ion form of a cation exchanger. In both cases, the components were successfully separated. The effect of the number of columns constituting the adsorber on the recovery of alpha-cyclodextrin was examined theoretically. The use of more than eight columns resulted in almost the same recovery. AS

2240 Kirchhoff (P-M), Biehl (B) and Crone (G). Peculiarity of the accumulation of free amino acids during cocoa fermentation. Food Chemistry 31(4); 1989; 295-311

Based on data from several authors and from our own analyses, the comp. of free amino acids (FAA) in fermented cocoa seeds is compared with the amino acid composition in hydrolysates (FAA) of unfermented cocoa seeds, legume seed globulins and cocoa seed storage proteins. The FAA of several cocoa samples are quite uniform and do not differ significantly from the FAA in legume globulins. They contain 33%:30% hydrophobic:acidic amino acids. The fa in fermented cocoa seeds are significantly different (58%:16). The ha of a fraction enriched in cocoa storage protein (41%:26%) which is the source of free amino acids is one, though insufficient, explanation of this difference. Fermentation-like seed incubations reveal that exudation of amino acids is not responsible but free acidic amino acids are metabolized during fermentation whereas leucine, alanine, phenylalanine and tyrosine are considerably accumulated, presumably due to specific activity of endopeptidases. Cocoa flavour is considered in relation to these findings. AS

Confectionery

Cocoa

Cocoa products

2241 Permanyer (JJ) and Perez (ML). Compositional analysis of powdered cocoa products by near infrared reflectance spectroscopy. Journal of Food Science 54(3); 1989; 768-769

Near infrared reflectance (NIR) spectroscopy was used to measure moisture, fat, and sucrose in powdered cocoa products. Spectra of a series of known samples were recorded and multiple linear regression techniques were used to relate the concn. of each parameter of reflectance measurements at selected wavelengths. Precision and accuracy were estimated to evaluate the potential application of the NIR spectroscopy in the quality control of powdered cocoa products. Results showed that moisture, fat, and sucrose could be analyzed in powdered cocoa products by near infrared reflectance spectroscopy because good correlation coeff. and low standard errors were achieved in prediction study. AS

Starch

2242 Chinachoti (P) and Steinberg (MP). Correlation of proton T_1 with polymer and solute waters in starch sucrose mixtures. Journal of Food Science 54(3); 1989; 691-694

Proton pulsed NMR methodology was applied to correlate the observed spin-lattice (T_1) and spin-spin(T_2) relaxation times with the amount of water associated to sucrose (SOL) and that to starch (POL) in a sucrose-starch model system containing both. Sucrose, starch and four mixtures were equilibrated to four water activities (0.86-0.97). Calculations for T_2 were invalid due to an undeterminable amount of molecular diffusion caused by field inhomogeneity in the magnet. Model equations were developed for calculating SOL and POL from T_1 and water activity. These values showed high correlations (R^2 > 0.97) with SOL and POL as determined from sorption data for sucrose and starch. This validated the use of this instrument with the mathematical models developed. AS

BAKERY PRODUCTS

2243 Lim (H), Setser (CS) and Kim (SS). Sensory studies of high multiple sweetener systems for shortbread cookies with and without polydextrose. Journal of Food Science 54(3); 1989; 625-628

Time-intensity (TI) sweeteness and bitterness curves determined for six potent sweetener combinations with and without polydextrose were compared to sucrose in shortbread cookies. Hardness, fracturability and cohesiveness of shortbreads were determined. Sweetener combinations of aspartame/cyclamate, aspartame/cyclamate/saccharin, acesulphame, K/saccharin, aspartame/saccharin/acesulphame K, acesulphame K/aspartame and aspartame/saccharin gave sweetener TI profiles similar to that of sucrose. Bitterness TI profiles were similar for all potent sweetener combinations but higher than for sucrose. Polydextrose increased hardness and fracturability and decreased cohesiveness of cookies compared to those made with potency sweeteners without polydextrose. Textural characteristics of polydextrose cookies approached those of sucrose shortbreads. AS

2244 Pon (CR), Lukow (OM) and Buckley (DJ). A multichannel, computer-based system for analyzing dough rheology. Journal of Texture Studies 19(4); 1989; 343-360

A cereal dough quality data acquisition and analysis system, based on an IBM PC interfaced to three mixographs and one farinograph, is described. The application software was developed using the commercial program ASYST (Asyst Software Technologies, Inc., Rochester, NY). Comparison of results from manually- and computer-calculated parameters from mixing torque versus time curves derived from identical samples are presented. AS

2245 Wang (HJ) and Thomas (RL). Direct use of apple pomace in bakery products. Journal of Food Science 54(3); 1989; 618-620, 639

Drum-dried apple pomace (DDAP), an edible by-product from single pass metallic membrane ultrafiltration of apple puree, was examined for comp. and utilization as a source of sugar and dietary fiber in bakery products. Total dietary fiber (TDF) of freeze-dried apple pomace (FDAP) and DDAP was 35.29% and 33.24%, resp. Total sugar of the apple pomace conc. (APC), FDAP, and DDAP was 54.34, 46.26, and 36.71% resp. Sensory evaluation demonstrated that the experimental muffins with 50% (w/w) of the plain wheat bran substitutad by powdered apple pomace were significantly (P < 0.01) more desirable than the control bran muffins. In addition, experimental moon cookies with flaked apple pomace substituted for 40% (w, of the all-purpose flour in the crust and 40% (w/w) of the quick-cooking oats in the filling were significantly (P < 0.01) more desirable than the control moon cookies. AS

Bread

2246 Cauvain (SP) and Chamberlain (N). The bread improving effect of fungal alpha-amylase. Journal of Cereal Science 8(33) 1988; 239-248

Nine characteristics of 62 commercial flours have been measured and the vol. recorded of loaves baked from them by the Chorley Wood Bread Process (a machanical dough development procedure) in the absence and presence of three levels of added alpha-amylase (FAA). A further 22 flours have been used to test the predictive powers of regressions, derived from the original 62, between loaf vol., flour characteristics and total alpha-amylase activity. The vol. of loaves from all 84 flours increased with increase in the FAA activity added. The loaf vol. FAA response curve had a negative exponential form but had poor predictive ability. The loaf vol. improving effect of FAA did not correlate with measured flour characteristics. Fungal alpha-amylase prolonged dough expansion time during baking. Multiple regression analysis was used to show that loaf vol. was correlated positively with flour protein and negatively with flour colour. AS

2247 Czuchajowska (Z), Pomeranz (Y) and Jeffers (HC). Water activity and moisture content of dough and bread. Cereal Chemistry 66(2); 1989; 128-132

Water activity and moisture contents were determined in mixed dough, fermented dough, bread crumb, and crust of loaves baked with various amounts of water (optimum, + 3%, or -3%) and/or for various times (21, 24, or 27 min). In addition, effects of changes in formulation, including replacement of orginial wheat flour by ball-milled wheat flour, on water activity and water content were determined. A decrease in added water considerably lowered loaf vol.; an increase in baking time slightly decreased loaf vol. Proofed samples, generally, were higher than mixed doughs in water contents and water activity. Doughs mixed with optimum water were lower in water activity than doughs mixed with excess water. There were large differences in water contents of crumb in bread baked with various baking absorption levels but not in samples baked for various times with optimum baking absorption. There was little change in water activity between the 1- and 24 h-old bread crumb. Moisture and water were higher in proofed dough than in 1-h old bread crumb. As time of baking increased, moisture and water activity in the crust of 1 h old bread decreased. In the crumb, water activity and moisture content were the lowest in bread baked by the full formula with the original flour. Exclusion of sugar or salt increased most moisture contents and water activity. The moisture and water activity generally, were lowest in the crust of bread baked by the full formula with the original flour and highest in bread baked with flour in which the starch was damaged. AS

2248 Galliard (T) and Collins (AD). Effects of oxidizing improvers, an emulsifiers, fat and mixer atmosphere on the performance of wholemeal flour in the Chorley Wood Bread process. Journal of Cereal Science 8(2); 1988; 139-146

The effects of oxidants, an emulsifier, fat and mixer atm. on loaf quality (vol. and texture) of wholemeal bread, made by a mechanical dough development procedure (Chorleywood Bread Process), were investigated. Both ascorbic acid (AA) and the emulsifier, diacetyl tartaric acid esters of monoglycerides (DASTEM) gave substantial improvements in loaf vol., and a marked synergistic effect between AA and DATEM was observed in both loaf vol. and texture. When AA (75 p.p.m.) was used in the recipe and the doughs mixed under partial vacuum or in an atm. of 10% 0:90% N loaf vol. was lower then when mixed in air; dehydroascorbic acid (75 p.p.m.) was more effective than AA at low 0 levels. No improvement in loaf vol was obtained when oxygen levels were increased above that in air. Loaves baked, using a low fat (0.7% flour wt. basis) recipe, from wholemeal flour that had been stored at 20 C for 17 wks had lower vol. than those from wholemeal kept at -20 C. Increasing the fat content of the recipe to 2% restored the loaf vol. given by 20 C wholemeals to those obtained with frozen wholemeal. AS

2249 Lonner (C) and Pre-Akesson (K). Effects of lactic acid bacteria on the properties of sour dough bread. Food Microbiology 6(1); 1989; 19-35

The effects of 13 different sour dough bacteria and a commercial sour dough starter from West Germany on the properties of sour dough bread were studied. As reference, a rye bread with lactic acid as souring additive was used. An expert taste panel, trained specifically for bread, was used to judge the bread. All organisms produced acids adequate for a good bread quality. However, the sour doughs fermented with the heterofermentative Lactobacillus spp. had higher acid equivalents, lower pH-value and also gave bread with stronger taste of acidity and acetic acid than those fermented with the monofermentative organisms. Correlation coeff. between taste values and analyses data also show that acetic acid has a great influence on the bread taste, whereas lactic acid seem to be of less importance. Two breads were judged to be somewhat different in taste compared to the others, namely those with sour doughs fermented with Lactobacillus alimentarius and Leuconostoc dextranicum. On comparison with the reference bread, the sour dough bread was judged to have a stronger taste of acidity and also a more aromatic and crispy crust. The bread baked with sour doughs fermented with the heterofermentative organisms, and thus containing the highest amounts of acetic acid, showed the best ability to prevent growth of the mould Eurotium rubrum. AS

2250 Skjoldebrand (C), Ellbjar (C), Andeersson (CG) and Eriksson (TS). Optical properties of bread in the near-infrared range. **Journal of Food Engineering** 8(2); 1988; 129-139

This paper reports on a method for detn. of the optical properties of bread. The optical properties of white bread have been studied. The measurements were carried out for dough, crumb and crust. The transmission and reflection measurements were made with a Beckman spectrophotometer with an integrating sphere. Transimission functions and penetration depths were calculated and compared with previous investigations made at this institute (SIK). The influence of peak power wavelength and spectral range (800-1250 nm and 1250-2500 nm) on the penetration depth for crust and crumb have been determined. This study has shown that it is possible to calculate penetration depth for any radiator using transmission data in the range 800-2500 nm. AS

2251 Tait (SPCGalliard (T). Effect on baking quality on changes in lipid composition during wholemeal storage. **Journal of Cereal Science** 8(2); 1988; 125-137

A simple and relatively rapid method for measuring the lipase activity of wholemeal flour has been developed. It involves measurement of the increase in fatty acid content observed during incubation of unhydrated wholemeal at elevated temp. The lipase activities of different samples of finely-milled wholemeal showed a high correlation with their known rates of deterioration (as measured by rates of oxygen uptake over a period of 20 wks storage under ambient conditions). There appeared to be close association between lipase activity and loss of baking performance during storage of wholemeal, with high lipase activity being associated with poor baking performance. Storage of wholemeal at + 20 C for 23 wks had a deleterious effect on baking quality (as measured by loaf vol. and crumb texture). Addition of pure oleic and linoleic acids to freshly-milled wholemeal in amounts typically found in storage-deteriorated flour were equally detrimental to loaf vol.; palmitic acid added at the same concn. had no effect. The effects of the fatty acids on baking quality were related to their ability to 'bind' to non-lipid components during dough mixing. Restoration of the triacylglycerol content in stored wholemeal (23 wks at + 20 C) to that found in the freshly-milled flour improved the baking performance of the stored wholemeal; however, addition of the same amount of triacylglycerol also improved the baking performance of freshly-milled wholemeal. Interchanging the lipids between freshly-milled and stored wholemeals showed that the extracted lipid fraction from the stored wholemeal could account totally for the decreases in baking quality observed when using stored wholemeal flour. AS

Cookies

2252 Gaines (CS) and Finney (PL). Effects of selected commercial enzymes on cookie spread and cookie dough consistency. Cereal Chemistry 66(2); 1989; 73-78

Seventeen commercial enzyme preparations having cellulase, protease, Beta-glucanase, Beta-glucosidase, or cellobiase activities were added to cookie doughs made with chlorine-treated soft red winter wheat flour. Cookie diameters and Instron universal testing machine physical-texture measurements of the doughs were made immediately after mixing and after holding for 2 h at 32 C. Several cellulase preparation from **Trichoderma reesei** were the most effective at maintaining stability of dough consistency and cookie size when doughs were held for 2 h before processing. When untreated doughs were held 2 h thay became more stiff and baked smaller cookies. The protease papain was the most effective at increasing cookie spread and top grain. At the concn. studied, papain produced sugar-snap cookies from hard red winter and hard spring wheat flours that were as large as control cookies made from soft red winter wheat flour. AS

2253 Shibukawa (S), Sugiyama (K) and Yano (T). Effects of heat transfer by radiation and convection on browning of cookies at baking. Journal of Food Science 54(3); 1989; 621-624, 699

The effects of modes of heat transfer (radiation or convection) on the baking colour development of food were studied. An experimental baking oven that could be altered to two heat transfer modes was designed; the ratio of heat by radiative transfer to total heat transferred was about 30% or 70%. The glucose-glutamate solutions were heated at different air temp. to measure the browning rates to calculate the activation energies. Cookies were baked at 200 C to measure the lightness of colour on the surface and the surface temp. It was clarified that the development of colour depended on the temp. only. AS

Dough

2254 Ewart (JAD). Hypothesis for how linear glutenin holds gas in dough. Food Chemistry 32(2); 1989; 135-150

In this paper a hypothesis is putforward to explain how dough resists uncontrolled expansion of gas cells. UJSPR.

Pasta

2255 Dick (JW) and Shelke (K). Net weight variation in packaged pasta. Cereal Foods World 34(2); 1989; 201-203

The authors have studied the changes in the pasta wt. over a tissue from the three storage location and two packaging materials. Pasta stored in all the three locations and two packaging materials showed a net loss in wt. when compared to the initial wt. The retail storage location showed a larger percentage change in pasta net wt.

than warehouse conditions. Pasta stored in paper board showed a larger percentage change in net wt. than did pasta stored in flexible bags. PHR

Spaghetti

2256 Kim (HI), Seib (PA), Posher (E), Deyoe (CW) and Yang (HC). **Improving the colour and cooking quality of spaghetti from Kansas hard winter wheat. Cereal Foods World** 34(2); 1989; 216-222

Fifty-one composite samples of Kansas hard red winter (HRW) wheats were milled into farina and processed into spaghetti. Using the criteria of milling yield, yellow pigment, and cooking quality, there was no difference among seven var. for spaghetti making, but location and yr affected spaghetti quality because of differences in wheat protein. The yellow pigment in the composities was in the range of 1.2-1.6 p.p.m. compared to 3.5-4.1 p.p.m. in two commercial samples of durum semolina. High-temp., medium-moisture drying of farina spaghetti preserved slightly more yellow pigment than low temp. drying. Adding 300 p.p.m. L-ascorbic acid or an equivalent level of L-ascorbate 2-phosphate increased yellow pigment by about 15%. Farina spaghetti having 10.7% protein was improved in cooking quality by the addition of 3% vital wheat gluten and 1% gylcerol monostearate (GMS). Addition of 1% GMS alone decreased stickiness about 40%, but cutting stress decreased about 18%. Addition of 5% modified wheat starch with high thickening power and shear stability reduced stickiness by about 38%. High-temp., low-moisture drying reduced stickiness slightly. Purifying a hard white winter (HWW) and a HRW wheat gave 30% and 15% farina, resp., with a speck count of 30 specks/10 in^2 Farina from the HWW contained up to 80% more yellow pigment than the HRW farina, but the cooking quality was the same. AS

Tef

2257 Umeta (M) and Faulks (RM). Lactic acid and volatile (C_2 - C_6) fatty acid production in the fermentation and baking of tef (Eragrostis tef). Journal of Cereal Science 9(1); 1989; 91-95

As practised domestically in Ethiopia, tef flour mixed with water was allowed to ferment by the action of the endogenous microflora to produce a sour dough prior to baking to produce injera, a pancake-like-bread. Lactic and acetic acids were the major organic acids produced (90%) with seven other volatile fatty acids (VFAs), propionic, isobutyric, n-butyric, isovaleric, n-valeric, isocaproic, n-caproic representing less than 5%. Baking reduced the proportion of acetic acid but not the other VFAs. Lactic and acetic acids are mainly responsible for the fall in pH during fermentation and for the sour taste of injera, whilst the VFAs are the main contributors to the characteristic flavour. AS

MILK AND DAIRY PRODUCTS

Milk

2258 Calvo (MM), Amigo (L), Olano (A), Martin (RJ) and Ramos (M). Effect of thermal treatments on the determination of bovine milk added to ovine or caprine milk. Food Chemistry 32(2); 1989; 99-108

Heat treatment of bovine, caprine and ovine milks at 74 C for 15 or 30 s caused negligible denaturation of whey proteins. After heat treatment at 90 C for 15 or 30 s, denaturation of Beta-lactoglobulin (Beta-lg) increased in the order bovine < caprine < ovine milk and denaturation of blood serum albumin (BSA) was in the order caprine < bovine < ovine milk. Mixing of bovine milk with carpine or ovine milk resulted in a 15-20% decrease in thermal stability of bovine Beta-lg when heated at 90 C for 30 s. Heat treatment at 74 C for 30 s did not affect the quantitative detn. of bovine milk in caprine or ovine milk using immunodiffusion or electrophoretic analysis of the whey protein fraction. Heat treatment at 90 C for 30 s allowed the detn. of bovine milk by electrophoretic analysis but not by the immunodiffusion method. AS

2259 Olano (A), Calvo (MM) and Corzo (N). Changes in the carbohydrate fraction of milk during heating processes. Food Chemistry 31(4); 1989; 259-265

Carbohydrate comp. of commercial pasteurized UHI sterlized and dried milk samples, and lab. heat-treated milks was determined by GLC. Glucose, galactose and lactulose were present in all types of commercial milk samples. The concn. of galactose and lactulose increase with the severity of the heating process. The amount of glucose present in commercial milks was similar to that found in unheated milk. Epilactose was only detected in sterilized milk samples. UHT and sterilized milks can be differentiated by their lactulose, galactose or epilactose content. AS

2260 Oman (MM). Changes of size distribution and surface area of protein particles in milk by application of the freeze-fracturing technique. Food Chemistry 31(3); 1989; 165-176

2261 Sechaud (F), Peguin (S), Coulet (PR) and Bardeletti (G). Fast and reliable organic acid determination in fermented milk using an enzyme-electrode based analyser. Process Biochemistry 24(1); 1989; 33-38

L-lactic acid and pyruvic acid were determined in dairy products without pretreatment in the range 1 x 10 m -1 x 10 m and 1 x 10 m - 5 x 10 m resp. using an enzyme electrode-based analyser allowing subtraction of eventual interference arising from the spontaenous oxidation of metabolities. Results were displayed 30-45 S after a 20 u sample injection and were directly expressed in mM. Injection can be made at intervals of 90 to 120 seconds (including automatic washing of the cell). Enzymic membranes remain unable with the same performance for two to three months. When yoghurt is used as starter for fermentation, a temp. ranging from 35-40 C has to be selected in view of a higher lactate formation; after six hr fermentation the lactic acid production varied slightly when the pyruvic acid content levelled off. The concn. and the influence of nature of the starter in the lactate production were also investigated. AS

62 Tsui (IC). Rapid determination of total cholesterol in homogenised milk. Journal of the American Oil Chemists" Society 72(3); 1989; 421-423

Capillary gas chromatographic method for cholesterol detn. in milk is described. The milk sample is saponified and the cholesterol is then isolated by solid-phase extraction on a non polar adsorbent and eluted with 5% methanol in chloroform. It is then derivatised and analysed. Cholestane is used as an internal standard. MNK

Milk products

Cheese

63 Masi (P). Characterization of history-dependent stress-relaxation behaviour of cheeses. Journal of Texture Studies 19(4); 1989; 373-388

This paper illustrates the influence of rate and extent of compression on the stress-relaxation behaviour of cheese. A new method of comparing responses obtained from tests made under different exp. conditions is presented. This method is based on the fact that curves obtained by plotting the normalized force F(t)F(0) against time on a logarithmic scale may be superimposed upon each other by horizontal shifting, thus providing a master curve which can be considered an inherent characteristics of the materials viscoelastic behaviour. The applicability of this approach to viscoelastic behaviour characterization of cheeses is illustrated. AS

Cheddar cheese

64 Sharma (SK), Ferrier (LK) and Hill (AR). Effect of modified manufacturing parameters on the quality of Cheddar cheese made from ultrafiltered (UF) milk. Journal of Food Science 54(3); 1989; 573-577

Cheddar cheese was made from milk concentrated two fold by ultrafiltration (UF). Lowering the cooking and cheddaring temp. from 39 C to 35 C resulted in faster acid development, promoted more proteolysis, caused faster degradation of lactose, and contributed smoother body and texture to the cheese. Starter culture at 2% by wt. of unconcentrated milk in combination with low cooking and cheddaring temp. reduced pH at faster rate and shortened the cheese making time by approx. 45 min. compared to cheese made using the traditional temp. (39 C). For the traditional temp. (39 C) of cooking and cheddaring, the addition of 0.2 ml/kg rennet of unconcentrated milk produced the same rate of proteolysis in both control and cheese made from UF retentate. Composition (fat, protein, salt and moisture) and yield of the UF cheeses with modified temp. treatments were not significantly different from control. AS

Grana Padano cheese

2265 Restani (P), Corsini (E) and Galli (CL). A novel approach to quantify the amount of formaldehyde added to milk in Grana Padano cheese production. Journal of Food Science 54(3); 1989; 578-580

Little information is available on the reaction products of formaldehyde (FA) with milk components. An isoelectric focusing (IEF) method was developed which detected a unique protein band with pI = 6.7 in defatted Grana Padano cheese samples prepared with FA. The quantity of FA (p.p.m.) added to milk may be extrapolated by calculating the amount of protein associated with this band. The IEF method was rapid, simple, highly specific, sensitive, reproducible, inexpensive and easy to utilize in routine controls. AS

Wheys

2266 Philips (LG), Yang (ST), Schulman (W) and Kinsella (JE). Effects of lysozyme, clupeine, and sucrose on the foaming properties of whey protein isolate and Beta-lactoglobulin. Journal of Food Science 54(3); 1989; 743-747

Lysozyme and clupeine interacted with Beta-lactoglobulin to form aggregates. Sucrose reduced the aggregation. The addition of lysozyme (0.5%) to Beta-lactoglobulin (2.5%) reduced the time required to reach an overrun max. and increased foam stability and heat stability by 124% and 377%, resp. Lysozyme (0.5%) also improved overrun (98%), foam stability (114%) and heat stability of the foams (12%) made with whey protein isolate (WPI, 5%). Lysozyme and sucrose further improved the foaming properties of Beta-lactoglobulin and WPI. The addition of clupeine and sucrose gave similar results. The foaming properties of Beta-lactoglobulin and WPI with the inclusion of sucrose and lysozyme were superior to those of egg white. AS

Milk proteins

Casein

2267 Roefs (SPFM), Van As (H) and Van Vliet (T). Pulse NMR of casein dispersions. Journal of Food Science 54(3); 1989; 704-708

The spin-spin relaxation time, T_2 of skimmilk, sodium caseinate dispersions and milk ultrafiltrate was measured as a function of pH and temp. using pulse proton NMR. The T_2, shows a max. around pH = 5.2 for skimmilk, decreases with decreasing pH for sodium caseinate dispersions and is independent of pH for milk ultrafiltrate. For all systems studied T_2 increases with temp., but, the extent of increase depends on the system. It is concluded that the T_2 of casein dispersions is mainly determined by factors determining the state of aggregation of the caseins. Apart from affecting the extent of aggregation of the casein particles, micellar calcium phosphate probably contributes also directly to the measured T_2 AS

MEAT AND POULTRY

Meat

2268 Dickson (JS) and Crouse (JD). Effect of electrical change on attachment of Salmonella typhimurium to meat surfaces. Journal of Food Science 54(3); 1989; 516-520

Treating tissue with electrical current was found to affect both the initial attachement and total numbers of attached Salmonella typhimurium to meat tissue. When lean tissue was attached to the positive terminal of the power supply operating at 50 volts/125 mA DC, the total number of attached cells increased. There was no effect when the samples were attached to the negative terminal. There was a significant ($P < 0.05$) effect on the percentage of strongly attached bacteria with an increase in treating time. Electrical current was found to increase the percentage of strongly attached cells immediately after the current was applied. AS

2269 Huebner (PH), Subranek (JG) and Olson (DG). Effects of meat temperature, particle size, and grinding systems on removal of bone chips from ground meat. Journal of Food Science 54(3); 1989; 527-531

Bone chips (9.5 mm or 13 mm) were added to ground meat batches (45.3 kg) at 0.5%. Meat batches were tempered to -2.2 C and 3.3 C to evaluate effect of temp. during grinding. Three commercial bone elimination systems were used for comparison. Grinding at -2.2 C was not significantly ($P < 0.05$) different from 3.3 C for bone in the final product but more bone remained in the grinder barrel after grinding at 3.3 C. The large chips were more readily fractured and passed to the final product. The channelled central system passed significantly ($P < 0.05$) more bone into the final product than the others. With all bone removal systems, the small chips were more readily removed from the grinder through the removal system. AS

2270 Ladwig (KM), Knipe (CL) and Sebranek (JG). Effects of collagen and alkalinephosphate on time of chopping, emulsion stability and protein solubility of fine cut meat systems. Journal of Food Science 54(3); 1989; 541-544

2271 Machail (JH) and Mast (MG). Resistance to tear. An instrumental measure of the cohesive properties of muscle food products. Journal of Food Science 54(3); 1989; 750-751, 753

An instrument was developed to measure cohesive properties of restructured muscle foods. The device, an attachment for the Texture Test System, consists of a spiked split-platform designed to hold a meat slice in place as the two sections of the platform are pulled apart. The force referred top as resistance to tear (RTT) required to tear a sample is transmitted via a transducer located at the stationary end of the split-platform. Experiments in which fish, broiler or turkey meat patties were formulated to provide differences in cohesive properties, showed that RTT measurements were responsive to the effects of formulation manipulations and corresponded well with sensory evaluations. AS

2272 Townsend (WE). Stability of residual acid phosphates activity in cured/canned picnic samples stored at -34 C for 15 and 36 months. Journal of Food Science 54(3); 1989; 752-753

Calculated internal temp. (based on residual acid phosphatase activity values) were determined for samples obtained from domestically prepared cured/canned picnics which previously had been heat processed to 61, 62.7, 65.5, 68.3 and 70.0 C, resp., and stored at -34 C for up to 36 months. There was a greater loss in residual acid phosphatase activity (based on an increase in calculated internal temp.) during the first 15 months of storage, with the least loss occurring during the next 21 months of storage. The greatest loss of activity occurred in those samples heat-processed to 61 C and 62.7 C which also contained the greatest amount of residual acid phosphatase activity. AS

Beef

2273 Anderson (TJ) and Parrish (JR (FC). Postmortem degradation of titin and nebulin of beef steaks varying in tenderness. Journal of Food Science 54(3); 1989; 748-749

2274 Larick (DK), Turner (BE), Koch (RM) and Crouse (JD). Influence of phospholipid content and fatty acid composition of individual phospholipids in muscle from Bison, Hereford and Brahman steers on flavour. Journal of Food Science 54(3); 1989; 521-526

2275 Trout (GR). Variation in myoglobin denaturation and colour of cooked beef, pork, and turkey meat as influenced by pH, sodium chloride sodium tripolyphosphate, and cooking temperature. Journal of Food Science 54(3); 1989; 536-540, 544

Beef patties

2276 Hanenian (R), Mital (GS), Usborne (WR). Effects of pre-chilling rate, and storage time on beef patty quality. Journal of Food Science 54(3); 1989; 532-535

2277 Hill (SE) and Prusa (KJ). Physical and sensory properties of lean ground beef patties containing methylcellulose and hydroxypropylmethylcellulose. Journal of Food Quality 11(4); 1989; 331-337

Beef steaks

2278 Miller (MF), Davis (GW), Seideman (SC), Ramsey (CB) and Rolan (TL). Effects of papain, ficin and spleen enzymes on textural, visual, cooking and sensory properties of beef bullock restructured steaks. Journal of Food Quality 11(4); 1989; 321-330

2279 Unklesbay (K), Keller (J), Unklesbay (N) and Subhangkasen (D). Determination of doneness of beef steaks using fuzzy pattern recognition. Journal of Food Engineering 8(2); 1988; 79-90

The C-means and K-nearest neighbour algorithms of pattern recognition were used as methods of determining the degree of doneness of beef ribeye steaks. For each method, an approach employing the theory of fuzzy sets was used in addition to the traditional crisp approach. Steaks were heat processed to various degrees of doneness. The red, green and blue components of the steak images were acquired using a digital image processing system. Values were then converted to the hue, intensity and saturation. The use of the mean and standard deviation of these six values as features was investigated. The means of the red, intensity and saturation and the standard deviation of the red were found to be of most value as features for the classification techniques investigated. AS

Cattle

Steer

2280 White (Fd), Reagan (JO) and Boggs (DL). Effects of electrical stimulation on tallow supplemented steer carcasses. Journal of Food Quality 11(4); 1989; 311-320

Mutton

Lambs

2281 Pham (QT) and Willix (J). Thermal conductivity of fresh lamb meat, offals and fat in the range -40 to + 30 C. Measurements and correlations. Journal of Food Science 54(3); 1989; 508-515, 520

The thermal conductivity of fresh lamb meat, offals and fat was measured over the temp. range of -40 to + 30 C using a guarded hot plate apparatus. Simple empirical equations were presented for the conductivity of high-moisture (65-to 80%) meat and offals. With independently obtained values of physical parameters, several theoretical models were tested to see if thermal conductivity could be calculated from comp. and temp. Over a wide range of comp. and temp., best predictions (in terms of mean, standard deviation and range of errors) were obtained with Levy's modification to the Maxwell-Eucken equation. Its accuracy was not unduly sensitive to the uncertainities in the values of the physical parameters, the prediction errors remaining in the range plus or minus 10% for all reasonable values of the latter. AS

Pork

2282 Anderson (JB), Davis (CE) and Reagan (JO). Size exclusion high-performance liquid chromatography of water-extractable proteins from hot-processed, electrically stimulated pork carcasses. Journal of Food Quality 11(4); 1989; 303-310

2283 Pasin (G), O'Mahony (M), York (G), Weitzel (B), Gabriel (L) and Zeidler (G). Replacement of sodium chloride by modified potassium chloride (cocrystalized disodium-5'-inosinate and disodium-5-Guanylate with potassium chloride) in fresh pork sausages. Acceptability using signal detection measures. Journal of Food Science 54(3); 1989; 553-555

2284 Wanous (MP), Olson (DG) and Kraft (AA). Pallet location and freezing rate effects on the oxidation of lipids and myoglobin in commercial fresh pork sausage. Journal of Food Science 54(3); 1989; 549-552

2285 Wanous (MP), Olson (DG) and Kraft (AA). Oxidative effects of meat grinder wear on lipids and myoglobin in commercial fresh pork sausage. Journal of Food Science 54(3); 1989; 545-548, 552

Products

Frankfurters

2286 Ladwig (KM), Knipe (CL) and Sebranex (JG). Effects of sodium tripolyphosphate on the physical, chemical and texual properties of high-collagen frankfurters. Journal of Food Science 54(3); 1989; 505-507

2287 Marquez (E), Ahmed (EM), Shireman (RB), Cornell (JA) and West (RL). Dietary effects of frankfurters with added beef fat and peanut oil. Journal of Food Science 54(3); 1989; 497-499, 526

2288 Park (J), Rhee (KS), Keeton (JT) and Rhee (KC). Properties of low-fat frankfurters containing monounsaturated and omega-3 polyunsaturated oils. Journal of Food Science 54(3); 1989; 500-504

Poultry

2289 Lea (JS), Dodd (NJF) and Swallow (AJ). A method of testing for irradiation of poultry. International Journal of Food Science and Technology 23(6); 1988; 625-632

A method for the detection of irradiated poultry is described. For chicken, free radicals produced by ionizing radiation within the hard crystalline matrix of bone can be detected by the technique of electron spin resonance (ESR) spectroscopy. The ESR signal increases linearly with dose over the likely commercial range and is stable over the probable shelf-life under likely storage conditions. The lower limit of detection is equivalent to a radiation dose of 50 Gy. The test appears equally applicable to turkey, duck and goose. AS

2290 Lin (SW) and Chen (TC). Yields colour and compositions of washed, kneaded and heated mechanically deboned poultry meat. Journal of Food Science 54(3); 1989; 561-563

Kamaboko-like products, prepared with NaCl and phosphate buffer wash solutions, had higher yields compared to those prepared with Na-acetate and polyphosphate solutions. Products prepared with polyphosphate wash solution were lightest in colour. Higher fat in mechanically deboned poultry meat caused lower yields than lower fat. There were no interactions (P > 0.05) between the temp. and salt concn. of the wash solutions on yields of products washed with various concn. of NaCl. Products prepared with NaCl wash solutions at 2-4 C had higher yields than those prepared at 20-22 C. Generally, products prepared with 1.0% or 1.5% NaCl wash solutions had higher Hunter "L" values and lower Hunter "a" values when compared to those prepared with 0 or 0.5% NaCl washing solutions. AS

Chickens

2291 Carponter (SL) and Harrison (MA). Survival of Listeria monocytogenes on processed poultry. Journal of Food Science 54(3); 1989; 556-557

The potential for Listeria monocytogenes to survive and proliferate on processed poultry was investigated. Chicken breasts were inoculated with L. monocytogenes, cooked to one of five different internal temp., then either vacuum-packaged or wrapped in an O permeable film and stored for up to four wk at 4 C and 10 C. Survivors were encountered at each cooking temp. employed. The magnitude of lethality was directly related to the cooking temp. No significant increase in microbial populations occurred through 2 wk of storage. Bacterial populations in samples that were overwrapped increased significantly by wk 4, except for the 160 F (71.1 C) treatment. For samples which were vacuum-packaged, only the bacterial population in the 150 F (65.6 C) treatment significantly increased. Differences due to packaging were observed at 4 C storage but not at 10 C storage. AS

Turkeys

2292 Ensor (SA), Ernst (EA), Sofos (JN) and Schmidt (GR). Quality characteristics of restructured turkey meat with variable alginate/calcium-lactose ratios. Journal of Food Science 54(3); 1989; 558-560

Restructured ground turkey and turkey breast meat patties, formulated with combinations of 0-1.0% sodium alginate, 0-0.1875% calcium carbonate and 0-0.6% lactate, were compared to a no additive control. The ratio of sodium alginate to calcium carbonate was held constant at 5.3 to 1. Optimal sensory and instrumental raw and cooked product bind was achieved with combinations of 0.4-1.0% sodium alginate, 0.0750-0.1875% calcium carbonate and 0.6% lactate. All restructured products with the algin/calcium binder had higher (P < 0.05) cook yields than the no additive control. Sensory aroma, flavour and juiciness of cooked products were not different (P > 0.05) between treatments. AS

Products

Eggs

2293 Morris (CE), Hoerning (EF) and Angelo (AJST). Uracil as a potentially useful indicator of spoilage in egg products. Journal of Food Science

54(3); 1989; 581-583

The relationship between sensory acceptability of egg products and their uracil content was investigated. Pasteurized liquid whole egg, albumen, and yolk were allowed to deteriorate for 5-8 days at temp. not exceeding 22 C. Periodically a panel of USDA inspectors evaluated the products odours and samples were frozen for analysis. Uracil and uridine were determined by high performance liquid chromatography. Uridine contents decreased and uracil contents increased as the products deteriorated. Spoilage odours were detected only in products containing greater than or equal to 1.7 μ g/g uracil. Analysis for uracil is potentially useful for objectively detecting egg decomposition. AS

Eggs

Egg yolk

2294 Ternes (W). Characterization of water soluble egg yolk proteins with isoelectric focusing. **Journal of Food Science** 54(3); 1989; 764-765

Separation and characterization of some water-soluble egg yolk proteins such as livetins and phosvitins were carried out by isoelectric focusing (IEF). The isoelectric points (IP) of phosvitins were in the pH-range of around 4, those of the livetins were in the range of 4.3 - 7.6. There are occurring differences between the bands of Alpha-, Beta- and Gamma-livetins. While the first mentioned had an amount of bands in the pH range 4.3-4.7, the Gamma livetins indicated only a few. Above that, a large number of bands can be noted in the range 5.3 to 5.5 referring to the Alpha- and Beta-livetins whereas none can be found when regarding the Gamma-livetins. AS

SEAFOODS

2295 Weaver (BJ) and Holob (BJ). Health effects and metabolism of dietary eicosapentaenoic acid. **Progress in Food and Nutrition Science** 12(2); 1988; 111-150

The beneficial effects that dietary fish and fish oils containing eicosapentaenoic acid in relation to the prevention of cardiovascular diseases have been reviewed. 244 references. BV

Clam

2296 Rukma Reddy (N) and Flick (GJ). Composition, flavour extract, protease, and glycosidases of clam bellies collected from clam processing plants. **Journal of Agricultural and Food Chemistry** 37(2); 1989; 341-345

Clam bellies were collected from clam processing plants (A and B) and analyzed for proximate comp., mineral content, and protease and glycosidase activities. The whole clam bellies contained 49.6-52.4%

of protein and large amounts of major minerals, P, Ca, Mg, K, and Na. The minor minerals reprasented 51% of ash in whole bellies. The flavour extract of clam bellies had unacceptable flavour and was found to be not useful in incorporation of it into human food products. The crude extracts of clam bellies from two plants contained both protease and glycosidases. However, beta-glycosidase activity was present in higher levels in the extract of clam bellies than the alpha-glycosidase activity. Laminarinase, beta-1,6-glucosidase, and beta-1,4-glucosidase activities were detected in the extracts of clam bellies collected from two clam processing plants. AS

Prawns

2297 Lindner (P), Angel (S), Weinberg (ZG) and Granit (R). Study of the proteolytic activity of the hepatopancreas of the freshwater prawn, **Macrobrachium rosenbergii**, and its role in inducing mushiness in muscle tissue during post-mortem storage. Food Chemistry 32(1); 1989; 19-29

The proteolytic activities of crude homogenates from the hepatopancreas of the prawn **Macrobrachium rosenbergii** were investigated. The caseinolytic and haemoglobin-hydrolysing activities are mainly due to thiol proteases with a minor contribution of trypsin-like activity. The hepatopancreas proteolytic activity is less efficient than trypsin in degrading myofibrillar proteins in intact tissue The collagenolytic activity in the homogenates differs in substrate specificity from bacterial collagenase. The specificity of these enzymic activities and their relation to mushiness in prawns stored in ice are discussed. AS

Sea cucumbers

2298 Chang-Lee (MV), Price (RJ) and Lampila (LE). Effect of processing on proximate composition and mineral content of sea cucumbers (**Parastichopus** spp.). Journal of Food Science 54(3); 1989; 567-568, 572

The nutrient content, texture and holothurin content of two sea cucumber sp. were determined for fresh, dried and canned products. Fresh sea cucumber contained 89-91% moisture, 5-6% protein, 0.3% fat, 3% ash and 0.3% carbohydrate; dried sea cucumber contained 2-6% moisture, 61-70% protein, 2.3% fat, 16-24% ash, and 2-3% carbohydrate. Fresh sea cucumber contained 90 mg of holothurin per 100g of tissue. Canned sea cucumber contained moisture and protein levels similar to those generally found in marine finfish. Processing methods for canned sea cucumber resulted in a significant ($P < 0.01$) decrease in K and increase in Na. No significant differences ($P < 0.01$) were found in the texture of canned products made from fresh-cooked, salted-cooked and cooked-dried raw material. AS

Fish

2299 El-Sebaiy (LA) and Metwalli (SM). Changes in some chemical characteristics and lipid composition of salted fermented bouri fish muscle (**Mugil cephalus**). Food Chemistry 31(1); 1989; 41-50

'Feseekh' is the traditional name in Egypt for salted-fermented Bouri Fish (Mugil cephalus). The effect of the salting-fermenting process on gross chemical comp. was studied. The lipid content decreased from 12.6 to 11.2% in small fish and from 7.5 to 6.3% in large fish accompanied by an increase in peroxide value and production of free fatty acids. TLC plates were used to study the lipid classes and individual phospholipids of fresh and salted fish. Phospholipids (PS), monoglycerides (MG) and triglycerides and hydrocarbons (TG & HC) showed a decrease while diglycerides (DG) and free fatty acids (FFA) showed a significant increase. The process resulted in a depletion in phosphatidyl inositol (PI), phosphatidyl choline (PC), sphingomyelin (SL) and phosphatidyl ethanolamine (PE). At the same time phosphatidic acid (PA) and lysophosphatidyl choline (LPC) showed significant increase. GLC analysis was used to study the fatty acid comp. of fresh and salted fish. The salting and fermenting process of fish resulted in a significant increase in C 16:0 , while C 20:4, C 22:5 and C 22:6 showed a great decrease. The ratio of unsaturates/saturates (U/S) decreased after the salting and fermenting process. AS

2300 Hsieh (RJ) and Kinsella (JE). Lipoxygenase generation of specific volatile flavour carbonyl compounds in fish tissues. Journal of Agricultural and Food Chemistry 37(2); 1989; 279-286

Lipoxygenase present in fish tissues can initiate the oxidation of polyunsaturated fatty acids to produce acyl hydroperoxides. With a gill homogenate as a model system, the capacity of gill lipoxygenase to generate short-chain volatile carbonyl compounds depended on the concn. of enzyme, substrate fatty acids, and duration of incubation period. The major volatile compounds generated from the oxidation of arachidonic and eicosapentaenoic acids by gill 12-lipoxygenase were 1-octen-3-ol, 2-octenal, 2-nonenal, 2-nonadienal, 1,5-octadien-3-ol, and 2,5-octadien-1-ol. The generation of oxidative flavours was related to the activity of the lipoxygenase and was inhibited by lipoxygenase inhibitors, esculetin, and BHA. AS

2301 Pigott (GM). Surimi. The "High Tech" raw materials from minced fish flesh. Food Reviews International 2(2); 1986; 213-246

This review covers development of surimi processing (the original Japanese Kamaboko industry, modernization of surimi production), resource for surimi production (pollock), modern surimi processing technology (minced flesh from deboning washing minced flesh and surimi processing sequence), ingredients for surimi-based products (salt, sugar, egg white, phosphates, starch, colour and flavour additives), surimi as base material for engineered and formulated foods, market segments for surimi utilization (National supplements and special products, binders, dried products, pet foods, fast food outlets), and market outlets for surimi-based products (Japanese market, US market, and other countries). 66 references. BV

2302 Vega (RE) and Brennan (JG). Enzymic hydrolysis of fish offal without added water. Journal of Food Engineering 8(3); 1988; 201-215

A significant finding of this work, concerned with the hydrolysis of cod (Gadus morhua) offal with papain (0.05% of fish offal, w/w, wet basis, at 65 C) was that the rate of hydrolysis was not dependent on the concn. of substrate in the range of 10-20% w/w dry matter. This, together with the fact that the `viscosity' of the minced offal was reduced considerably at 65 C, made it possible to carry out the hydrolysis without the addition of water. Consequently, the major factors influencing processing and capital investment costs, namely energy for water removal, power for mixing and equipment size, could be substantially reduced. It was also found that enzyme inactivation after hydrolysis could be carried out by heating up to only 80 C and maintaining that temp. for 12 min; this treatment reduced the enzyme activity to 1% of its original value. AS

Cod

2303 Hastings (RJ) and Currall (JEP). Effects of water, oil, egg white and starch on the texture of cod surimi gels by response surface methodology. Journal of Texture Studies 19(4); 1989; 431-451

The levels of water, corn oil, egg white and potato starch were varied in cod surimi gels according to a central composite design. Response surface analysis modelled the effects of each ingredient on textural properties and the interaction of the effects between pairs of ingredients. The effect of water, corn oil, and egg white was an overall softening of the gel and reduction in elasticity. Water and egg white increased the moisture content, water loss and wateriness in the mouth, whereas corn oil reduced the first two parametes but had little effect on sensory properties. Starch and a firming effect, increased elasticity, and reduced wateriness., Albumen interacted most strongly with the other ingredients, and reduced the extreme firmness of high starch gels while retaining and improving the springiness and elasticity contributed by starch. The modelling of effects in detail should help in selection of ingredients when a particular texture is required in future development projects. AS

Crayfish

2304 Godber (JS), Wang (J), Cole (MT) and Marshall (GA). Textural attributes of mechanically and cryogenically frozen whole crayfish (Procambarus clarkii). Journal of Food Science 54(3); 1989; 564-566

Textural quality of quick frozen and conventionally frozen whole crayfish was evaluated. Toughness, as measured by Kramer shear press, increased significantly (P less than or equal to 0.05) as a result of freezing. Between 6 and 16 wk of frozen storage, toughness increased (P less than or equal to 0.05) in seasoned (SCF) samples but remained the same in all other treatments. In all treatments, toughness declined after 16 wk of frozen storage. Individually quick frozen (IF) samples were more tender (P less than or equal to 0.05) than conventionally frozen (CF) samples. Seasoned crayfish had the greatest degree of toughness (P less than or equal to 0.05) during frozen storage, with IQF samples showing the smallest changes. SCF samples had significantly (P less than or equal to 0.05) lower moisture retention and more (P less than or equal to 0.05) lipid oxidation. AS

Mackerels

2305 Body (DR) and Vlieg (P). Distribution of the lipid classes and eicosapentaenoic (20:5) and docosahexaenoic (22:6) acids in different sites in blue mackerel (Scomber australasicus) fillets. Journal of Food Science 54(3); 1989; 569-572

The distribution of lipid in various sites of the edible fillets of the blue mackerel (Scomber australasicus) was determined. Specific details of the lipid comp. of the dark and white muscles were provided by column and thin layer chromatography. Dark muscle contained 20% lipid whereas white muscle had only 4% lipid. However, white muscle lipid was relatively much higher in phospholipids; 19% vs 10% in dark muscle lipid. The major phospholipids were phosphatidylcholine, phosphatidyl ethanolamine, and sphingomyelin. These were distributed in similar proportions in both muscles, although the white muscle phospholipids included more polyunsaturated eicosapentaenoic (EPA) and docosahexaenoic (DHA) acids than those of the dark muscle. AS

Sardines

2306 Roussel (H) and Cheftel (JC). Characteristics of surimi and kamaboko from sardines. International Journal of Food Science and Technology 23(6); 1988; 607-623

Washing steps decreased the yield of washed fish mince (21-27 g/100 g of whole fish), and the protein recovery (50%-55%) of that present in the unwashed mince, but caused efficient lipid removal (80%) leading to surimi containing only 0.2-1.4% lipid. The texture and colour of the final kamaboko were also improved. The texture parameters (folding score, rigidity, elasticity, index and gel strength) of kamaboko prepared from very fresh sardines were markedly enhanced by gel setting during incubation at 37 C for 30 min or 4 C for 24 h. Incubation at 60 C for 30 min led to soft, coarse gels, omiting potato starch or replacement by spray dried egg white had little effect on texture. The texture of kamaboko prepared from less fresh sardines was less firm and elastic, did not improve when incubation was carried out at 37 C or 4 C before cooking, and was softer and coarser after incubation at 60 C. Partial or total replacement of potato starch by egg white, soy protein isolate or bovine serum albumin markedly improved the texture. Egg white also increased the colour lightness. BV

Tilapia

2307 Shiau (S-Y) and Shue (MJ). Effects of prefrying times on the nutritive value of canned tilapia meat. Journal of Agricultural and Food Chemistry 37(2); 1989; 385-388

Tilapia meat was placed in the fryer filled with frying oil preheated to 180 C. The frying times were 2, 5, 10, 15, or 20 min.

The fried meat was then packed in 209 x 409 cans, hermetically sealed, and retorted. As the frying time increased beyond 10 min, available lysine and in vitro protein digestibility of the meat decreased significantly ($P < 0.05$) in fried tilapia meat. Rats on diets of tilapia meat fried for 15 or 20 min containing 10% protein had poor growth and lower net protein utilization (NPU) ($P < 0.05$) than that of rats of diets of tilapia meat fried for 2 or 5 min. Canned tilapia meat prefried for 15 min had higher sensory scores of odour and flavour, whereas the scores of colour and texture were high for canned tilapia meat prefried for 10 min. AS

Fish

Fish pastes

2308 Vishwanath (W) and Sarojnalini (CH). Changes in the total oxalate content in the fermentation of fish paste hentak. Journal of Food Science 54(3); 1989; 754-755

Total oxalate of the sliced petioles of Alocasia macrorhiza was reduced by 41.3% on incubation for 7 days at room temp. (18-23 C). When incubated after mixing with an equal wt. of powered sundried fish Esomus danricus for the preparation of a fermented fish paste hentak, oxalate was decreased by 84.4%. This loss was inhibited to a great extent by treatment with antibiotics. Some specific microorganisms grown in this particular medium might play an important role in the destruction of oxalate in the paste. AS

PROTEIN FOODS

Nil

ALCOHOLIC AND NON-ALCOHOLIC BEVERAGES

Alcoholic beverages

Wines

2309 Barcenilla (J), Estrella (I), Gomez-Cordoves (C), Hernandez (T) and Hernandez (L). The influence of yeasts on certain non-volatile components of wine. Food Chemistry 31(3); 1989; 177-187

Industrial grape must from white Airen grapes was fermented using three yeast sp. one for each of the three traditional stages of fermentation. In this work pure and mixed cultures were used. TLC, HPLC, and GLC were used to analyse the flavonoid and non-flavonoid phenol, polyalcohol and residual sugar comp. Differences in concn. of phenolic compounds, polyalcohols and sugars, were found to vary depending on the yeast sp., in pure or mixed fermentations. AS

2310 Delfine (C). Ability of wine malolactic bacteria to produce histamine. Sciences des Aliments 9(2); 1989; 413-416

In synthetic medium containing 67 mg/l of histidine, 46 strains of Leuconostoc sp. of which 33 were Leuconostoc oenos, and four strains of Lactobacillus spp. produced only 0.5-1.5 mg/l of histamine, as compared to nearly 3 mg/l for Pediococcus cerevisiae. AS

Non-alcoholic beverages

Coffee

2311 Soiro (M), Toumi (R) and Kandiah (M). The kinetics and mechanism of caffeine infusion from coffee. The hindrance factors in intra-bean diffusion. Journal of the Science of Food and Agriculture 46(3), 1989; 349-356

Green and medium-roast Kenyan arabica coffees were ground and sieved, and the 0.85 - 1.18 mm size fractions partially converted into two water-swollen forms by an appropriate series of treatments. The first form still contained a mix of coffee solubles, the second only caffeine. The rates of caffeine infusion into water at 80 C were then measured for the dry coffee and for the two water-swollen preparations. The caffeine was extracted two to three time faster from the solute-free water -swollen preparation than from the dry material. Analysis of the results showed that counterflow of water, the swelling of coffee particle, caffeine association with other solubles and physical restraints within the bean matrix all contribute to the low diffusion coeff. of caffeine inside the coffee particles. The behaviour of the green and the medium roast coffees was surprisingly similar. AS

Fruit juices

Apple juices

2312 Constenla (DT), Lozano (JE) and Crapiste (GH). Thermophysical properties of clarified apple juice as a function of concentration and temperature. Journal of Food Science 54(3); 1989; 663-668

Effect of concn. and temp. on thermophysical properties of clarified apple juice was studied. Density, viscosity, specific heat, and thermal conductivity were measured at different conditions, ranging from 20 to 90 C and 12 to 70 C Brix. Experimental data were related to the corresponding properties of water and compared with the behaviour of sugar solutions. The results obtained were used to derive mathematical models and correlations for predicting these properties as a function of both concn. and temp. AS

2313 Hsu (JC), Healtherbell (DA) and Yorgey (BM). Effects of fruit storage and processing on clarity, proteins, and stability of Granny Smith apple juice. Journal of Food Science 54(3); 1989; 660-662

`Granny Smith' apples were processed into juices and conc. from fruits which had been stored at 1 C for three months (short-term, ST) and nine months (long-term, LT). Total soluble proteins decreased with storage time of frutis. Juices processed from ST fruits were more resistant to haze formation (heat stability test) than those processed from LT fruits. For juices processed from ST apples, haze formation was related to proteins in the MW range or 21,000 to 31,000 daltons. For juices processed from LT apples, haze formation was not only related to proteins but also to other components in the juices. Fining was recommended to prevent haze and sediment formation. AS

2314 Rhim (JW), Nunes (RV), Jones (VA) and Swartzel (KR). Kinetics of colour change of grape juice generated using linearly increasing temperature. Journal of Food Science 54(3); 1989; 776-777

Kinetics of the colour change of grape juice was studied using linearly increasing temp. for heating Noble grape juice in a stainless steel reactor. The juice was heated from 60 to 95 C in 9 h. Kinetic parameters for the colour change were determined using Hunter L, a, b-values, chroma values, and Total Colour Difference (TCD) values. The reaction of the colour change of grape juice measured by L-and a-values, and Chroma value followed first order kinetics with activation energies of 114.75, 131.80, and 121.21 kJ/mol and frequency factors of 1.30×10^{12}, 8.95×10^{14} and 1.93×10^{13} sec^{-1}, resp. However, the reaction measured by TCD followed zero order kinetics with the activation energy and the frequency factor of 92.81 kJ/mol and 4.80×10^{10} mol/l/sec, resp. AS

Kiwifruit juices.

2315 Wong (M) and Stanton (DW). Nonenzymic browning in kiwifruit juice concentrate systems during storage. Journal of Food Science 54(3); 1989; 669-673

The contributions of different nonenzymic browning reactions to colour changes in stored kiwifruit juice conc. were investigated using five synthetic model conc. The model systems were stored at 20 C for 10 wks and analyzed for browning, haze, ascorbic and dehydroascorbic acids, titratable acidity, formol value. In addition the profiles of sugars, nonvolatile acids, and amino acids were determined. Two different classes of nonenzymic browning mechanisms were found to be of significance: the Maillard browning reactions and ascorbic acid browning reactions. Reactions involving ascorbic acid were found to contribute more to overall browning than Maillard browning. AS

Orange juices

2316 Ekasari (I), Bone stroo (MH), Jongen (WMF) and Pilnik (W). Mutagenicity and possible occurrence of flavonol aglycones in heated orange juice. Food Chemistry 31(4); 1989; 289-294

Orange juices were heated at 93 C for 1-30 min and hydrolysed with 1M HCl for 1 h at 100 C. The resulting heat-treated orange juice and acid hydrolysate were analysed for flavonol aglycones (Kaempherol and quercetin) and mutagenic activity towards Salmonella typhimurium TA 100 without S9 mix. Results show that mild heat treatments normally applied in the processing of orange jucies are insufficient to liberate mutagenic flavonol aglycones from their glycosides. These findings support the hypothesis that heating produces Maillard intermediary products (MIP) which, after neutralisation to pH 7.4 and under specific preincubation conditions (4 h at 37 C and pH 7.4), give rise to mutagenicity and cytotoxicity. AS

2317 Li (Z), Alli (I) and Kermasha (S). Use of acidification, low temperature and sorbates for storage of orange juice. Journal of Food Science 54(3); 1989; 674-678

The effects of acidification, combination of acidification and low temp. and sorbates on the storage of orange juice were investigated. Acidification of orange juice to pH 2.0 and pH 2.5 followed by stroage at 5 C resulted in marked reduction in total plate count and yeast and mold population during twelve wks of storage. Use of 0.03% sorbic acid or potassium sorbate in combination with acidification at pH 2.5 resulted in preservation of orange juice stored at 10 C over 10 wk period; however, vitamin C degradation was enahanced by the presence of the sorbates. The results also indicated that relatively high concn. of vitamin C were present in orange juice containing high population of microorganisms. AS

2318 Sanchez Perez (A), Hernandez Mendez (J) and Gomez Barez (JA). Polarographic and spectrophotometric determination of citrate in commercial orange and lemon drinks. Food Chemistry 32(1); 1989; 69-79

A polarographic method for the direct detn. of citrate is developed and applied to the analysis of citric acid and citrate contents in orange and lemon soft drinks. The method is based on the anodic oxidation of a dropping copper amalgam electrode (DCAE) in the presence of citrate in perchlorate medium, pH 6.3-8.3, by measuring the first derivative polarographic peak obtained at -0.15 V (vs SCE). The method is compared with the spectrophotometric one based on the formation of coloured sp. when citric acid and citrate are treated with metol and potassium dichromate. AS

Tea

2319 Bhuyan (LP) and Mahanta (PK). Studies on fatty acid composition in tea **Camellia sinensis.** Journal of the Science of Food and Agriculture 46(3); 1989; 325-330

The proportions of fatty acids, viz lauric, myristic, palmitic, oleic, linoleic, and linolenic, in tea leaf, **Camellia sinensis** (L) O Kuntze, were determined at different stage of manufacture as well as in black tea. No significant variations were observed in the fatty acid contents of three major cvs, Assam, China and Cambodia. However, some variations were noticeable in leaf cropped in different months. Manufacturing stages have a pronounced effect on the relative proportions of the various fatty acids. Monthly distribution of total lipid was also followed in tea leaf, and the pattern of variation observed was identical for all the three cvs. AS

2320 Yoshitomi (H). Drying characteristics of tea leaves. **JARQ (Japan Agricultural Research Quarterly)** 22(4); 1989; 302-309

Basic drying characteristics of tea leaves and its change in a primary dry process is discussed. This will be useful for improvement and development of tea manufacturing process and machines. Equilibrium moisture content, diffusion, coeff. of tea leaves, and drying characteristics of tea leaves in a primary drying process is covered. BV

FATS AND OILS

Oils

2321 Essien (AI), Fetuga (BL) and Osibanjo (O). Beta-carotene content and some characteristics of under-exploited seed oils of forest trees in Nigeria. **Food Chemistry** 32(2); 1989; 109-116

The Beta-carotene contents of 21 seed oils of forest trees were determined. Values ranged from 11.97 µ g/100 g oil for **Berlinia auriculata** to 684 Mug/100 g for **Lonchocarpus caprium**. Six of the seed oils (from **B. monadra, T. tetraptera, P. osun, L. caprium, T. scleroxylon** and **V. africana** were identified as useful source of vitamin A activity based on their carotene content. Beta-carotene values of these seed oils were generally much higher than those for palm kernel oil, beniseed oil and corn oil. Some physical and chemical characteristics of 13 of these seed oils were also investigated. The refractive index averaged 1.467 plus or minus 0.005 while the mean values for iodine value, saponification value, and per cent unsaponifiable matter were 77.8 plus or minus 4.7, 158 plus or minus 6.2 and 1.17 plus or minus 0.12, resp. Values for volatile matter, moisture, peroxide value and free fatty acid are also discussed. Generally, these seed oils exhibited characteristics similar to those reported in the literature for other oils. AS

2322 Sinram (RD) and Hartman (GJ). Flavoured vegetable oils as a substitute for beef tallow in deep-frying applications. **Food Technology** 43(6); 1989; 90-94

New tallow-like flavouring gives vegetables oils the flavour and functionality of beef tallow without cholesterol. This article discusses the aspects of these tallow-like flavourings in vegetable oils and details the end-use approach. Important factors related to flavour development during deep-frying are also explained. GAR

Sesame oils

2323 Yen (G-C) and Shyu (S-L). Oxidative stability of sesame oil prepared from sesame seed with different roasting temperatures. **Food Chemistry** 31(3); 1989; 215-224

Sesame oils were prepared from sesame seed with different roasting temp. (A, 180 C, B, 190 C; C, 200 C and D, 210 C) before pressing and then stored at various conditions for the evaluation of their oxidative stability in comparison with refined soybean oil. No apparent differences were found in peroxide formation between sesame oils stored in the dark at room temp. However, peroxide, and conjugable oxidation products of sesame oil (A) and soybean oil increased rapidly on exposure to fluorescent light or stored at 60 C. Amounts of volatiles in sesame oils exposed to fluorescent light or stored at 60 C increased markedly, especially pentane and hexanal, but were lower than in soybean oil. Sesame oil (C) had higher oxidative stability and flavour scores than other samples when exposed to fluorescent light. AS

SPICES AND CONDIMENTS

Spices

Chillies

2324 Dhanelappagol (MS), Shashidhara (SD) and Kulkarni (GN). Studies on drying characteristics of chillies. Journal of Agricultural Engineering 25(3); 1988; 72-75

A lab. study was carried out to determine the drying characteristics of chillies, using fresh harvested chillies ('Byadgi' var.) at about 45% seed moisture content (db). Results show that both the drying rate and the total drying time depend upon the initial moisture content of the seed, and the temp. and rh of drying air. Heat utilization factor (HUF) increased with decrease in drying air temp. Drying rate increased with increase in air temp. and total drying time decreased with increase in air temp. AS

Fenugreek

2325 Hemavathy (J) and Prabhakar (JV). Lipid composition of fenugreek (Trigonella foenum-graecum L.) seeds. Food Chemistry 31(1); 1989; 1-7

Total lipids extracted from fenugreek (Trigonella foenum-graecum L.) seeds amounted to 7.5% of the dry seeds. The total lipids consisted of 84.1% neutral lipids, 5.4% glycolipids and 10.5% phospholipids. Neutral lipids consisted mostly of triacylglycerols (86%), diacylglycerols (6.3%) and small quantities of monoacylglycerols, free fatty acids and sterols. At least five glycolipids and seven phospholipids were identified. Acylmonogalactosyl diacylglycerol and acylatedsterylglycoside were the major glycolipids, while sterylglucoside, monogalactosylmonoacylglycerol and digalactosyldiaclglycerol were present in small amounts. The phospholipids consisted of phosphatidylcholine, and phosphatidylethanolamine as major phospholipids and phosphatidylserine, lysophosphatidylcholine, phosphatidylinositol, phosphatidylgycerol, and phosphatidic acid as minor phospholipids. The fatty acid comp. of these different neutral lipids, glycolipids and phospholipids was determined. AS

Garlic

2326 Minami (T), Boku (T), Inada (K), Morita (M) and Okazaki (Y) Odour components of human breath after the ingestion of grated raw garlic. Journal of Food Science 54(3); 1989; 763

The major odour components of finely grated, raw garlic in the air of the human mouth have been studied. Immediately after garlic ingestion, tests of the mouth air of six subjects revealed two major peaks that were positively identified as being allyl mercaptan and diallyl disulphide, these findings are based on an evaluation of the fragment patterns of a GC-MS analysis and from the actual retention times of these authentic compounds. The allyl mercaptan level was higher than the level of diallyl disulphide, although both compounds smell like garlic. Our results suggest that after garlic ingestion, allyl mercaptan is the major garlic-smelling compound in human mouth air, and diallyl disulphide is secondary. AS

2327 Yu (T-H), Wu (C-M) and Lion (Y-C). Effects of pH adjustment and subsequent heat treatment on the formation of volatile compounds of garlic. Journal of Food Science 54(3); 1989; 632-635

Effects of pH adjustment during the blending of garlic cloves and subsequent heat treatment on the formation of volatile compounds of garlic were studied by means of gas chromatography (GC). The formation of the two isomeric cyclic compounds 3-vinyl-[4H]-1,2-dithiin and 2-vinyl-[4H]-1,3-dithiin, which were artifacts from allicin, was favoured around pH 5.5, Formation of diallyl trisulphide, methyl allyl trisulphide, cis-1-propenyl allyl disulphide, isobutyl isothiocyanate, 2,4 dimethylfuran, 1,3-dithiane, aniline, methyl allyl sulphide, dimethyl disulphide and 3-methyl-2-cyclopentene-1-thione were favoured in neutral or weak acidic conditions, whereas formation of diallyldisulphide, diallyl sulphide, methyl allyl disulphide, propenylthiol, propylallyl disulphide and 1,2 epithiopropane were favoured around pH 9.0. AS

SENSORY EVALUATION

2328 Arnaud (JP), Choplin (L) and Lacrox (C). Rheological behaviour of kappa-carrageenan/locust bean gum mixed gels. Journal of Texture Studies 19(4); 1989; 419-430

Oscillatory shear exp. and compressional testing of Kappa-carrageenan/ Locust Bean Gum (LBG) mixed gels have been conducted. The incorporation of LBG and the hardening treatment in KCl solution have been studied. The rheological behaviour of these gels to be used as entrapment matrix in fermentation processes has also been evaluated in supplemented whey permeate medium as fermentation broth. Results showed improved rheological properties following LBG complementation and KCl hardening treatment of Kappa-carrageenan gels. On the other hand, the elasticity strongly decreased in the broth medium, especially for pure Kappa-carrageenan gels. Exp. suggests the existence of a min critical LBG complementation (8% of 3% polymer gel) for best rheological properties: high rigidity and important damping properties. [illegible]

2329 Oakenfull.(DG), Parker (NS) and Tanner (RI). Method for determining absolute shear modulus of gels from compression tests. Journal of Texture Studies 19(4); 1989; 407-417

The standard method for measuring the shear modulus of a gel is the U-tube method of Saunders and Ward. This method is slow, requires special glassware and presents problems for gels which synerese and do not adhere to glass. The method described overcomes these problems and is particularly suited to soft, weak gels. The gel is formed in a cylindrical dish and subjected to a very small comprssion by a flat probe. Any apparatus which measures applied force as a function of penetration can be used to obtain an apparent Young's modulus. This is converted into the absolute shear modulus by multiplying by a factor which depends only on the geometry of the measuring system. Values for this factor were calculated numerically using a boundary element simulation procedure. There was excellent agreement with values obtained exp. for gelatin gels for which the shear modulus had been measured by the method of Saunders and Ward. AS

2330 Tanaka (M). Texture of Japanese foods. Food Reviews International 2(2); 1986; 247-265

Review. 41 references. BV

FOOD STORAGE

2331 Hunter (A). Temperature and moisture front movement in an aerated seed bulk. Journal of Agricultural Engineering Research 40(2); 1988; 113-127

The object of this work was to permit the subject to temp. and moisture fronts in an aerated seed bulk expressed in terms of parameters such as specific heats and densities. It is demonstrated here that the speed of the moisture fronts was very sensitive to the accuracy of the filling of the isotherm data. Based on conservation and equilibrium equations the front speed was determined. This presentation lead to a direct method of prediction of dwell state which does not use numerical integration. Explicit expressions are given for the speed of temp. and moisture fronts. Results for temp. and moisture front speeds are given graphically for Australian wheat. The work is equally applicable to porous or particulate hygroscopic media other than seeds. RS

2332 White (NDG) and Jayas (DS). Safe storage conditions and infestation potential of canola meal by fungi and insects. Journal of Stored Products Research 25(2); 1989; 105-114

INFESTATION CONTROL AND PESTICIDES

Pesticides

2333 Don-Pedro (KN). Insecticidal activity of some vegetable oils against **Dermestes maculatus** degree (Coleoptera:Dermestidae) on dried fish. **Journal of Stored Products Research** 25(2); 1989; 81-86

The insecticidal activity of some vegetable oils against **Dermestes maculatus** Degeer on dried trout (**Salmo garidnerii**) was investigated. In exp. under simulated storage conditions, the application of oils (groundnut, traditional coconut, industrial coconut, palm, shark liver oil) to exposed surface dried trout significantly reduced the development of progeny of **D. maculatus** only at dosage in excess of 56 ml/kg. However, when **D. maculatus** eggs were assayed against groundut oil, freshly applied on dried trout surface, the LG value was found to be as low as 18.29 ml/kg. It was observed that absorption of surface oil by fish muscle over time reduced activity against eggs. Generally, the oils were shown to act mainly against eggs and to have no direct toxicity against active stages of the insect. Topical and glass film application of vegetable oils against adults and larvae confirmed these observation. On the basis of available data, the possibility of using successive applications of fixed vegetable oils in controlling **D. maculatus** on dried fish is discussed. AS

Fungicides

2334 Chander (H) and Ahmed (SM). Comparative evaluation of fungicidal quinones and natural embelin against some insect pests of storage. **Journal of Stored Products Research** 25(2); 1989; 87-91

The effectiveness of the commercial seed-treatment quinone fungicides, chloranil and dicholne, as protectants of wheat against the stored-product insect pests, **Sitophilus oryzae**, Rhyzopertha dominica and **Ephestia cautella**, was studied. Their activity was also compared with thea of natural embelin, a benzoquinone isolated from the berries of **Embelia ribes**. Embelin and chloranil at concn. of 0.0125 and 0.025% (w/w) resp. in wheat, produced mortalities of 77.8 and 68.7% in adult **S. oryzae** after 14 days exposure; while dichlone produced 82.8% mortality at a 0.1% concn. level. Aganinst **R. dominica** dichlore, even at a 0.0125% concn. level gave 78% adult mortaility after 14 days, whereas mortality with embelin and chloranil at 0.025 concn. level significantly reduced the production of progeny by **S. oryzae** and **R. dominica**, while chloranil did so only at the 0.05 level. Dichlone did not exhibit any chemosterilant action on the adults of **S. oryzae** or **R. dominica**, or any inhibitory effect on oviposition by **S. oryzae**. Adult emergence of **E. cautella** was significantly low in all the quinone treatments as compared with the controls. Dichlone controlled insects at the rate recommended for fungicidal application. AS

BIOCHEMISTRY AND NUTRITION

Biochemistry

2335 Deshpande (SS) and Damodaran (S). Effect of phytate on solubility, activity and conformation of trypsin and chymotrypsin. Journal of Food Science 54(3); 1989; 695-699

Phytate:proteinase interactions and their effects on the solubility, activity, and conformation of trypsin and chymotrypsin were investigated in model systems. At pH 3.0, phytate at 0.167-0.250 (w/w) ratios formed insoluble complexes with both the enzymes, while at pH 7.8, Ca^{+} was required for the complex formation. At pH 7.8, phytate increased trypsin and chymotrypsin activity by 5-7%. The mean chymotrypsin activity was increased by about 18% when interactions were carried out at pH 3.0, whereas under similar conditions, trypsin activity was strongly inhibited. Circular dichroism spectroscopic studies revealed conformational changes in the enzyme secondary structure that seemed to have influenced their activity. The role of phytate in protein metabolism and the possible ramifications of present findings in human nutrition were addressed. AS

2336 Hart (RJ), White (JA) and Reid (WJ). Occurrence of O-tyrosine in non-irradiated foods. International Journal of Food Science and Technology 23(6); 1988; 643-647

2337 Kim (SM) and Zayas (JF). Processing parameters of chymosin extraction by ultrasound. Journal of Food Science 54(3); 1989; 700-703

Conventional chymosin (rennin) production requires a prolonged extraction. An ultrasound method of chymosin extraction was developed for increased efficiency. Ultrasound extraction was carried out with Tekmar sonic disruptor (TK 1000) and Lauda circulator. Control extraction was carried out by shaking. The use of ultrasound resulted in a significant reduction of extraction time with increases in activity and yield of chymosin. The optimal parameters for ultrasound extraction were: specific intensity, 36 W/cm^2 at 20 kHz frequency; time of exposure, 80 min; temp, 25 C; ratio of abomasa to extraction solution, 1:25; and activation time of prochymosin, 13.0-13.5 h. AS

2338 Ranhotra (GS), Gelroth (JA), Reeves (RD), Rudd (MK), Durkee (WR) and Gardnes (JD). Short-term lipidemic responses in otherwise healthy hypercholesterolemic men consuming foods high in soluble fiber. Cereal Chemistry 66(2); 1989; 94-97

This study examined the effect of foods high in water-soluble fiber on serum total cholesterol (CH), high-density lipoprotein CH, triglycerides, and glucose in otherwise healthy hypercholesterolemic (CH, 224 plus or minus 24 mg/dl) men. Seventeen adults participated in this study and each served as his own control. Each consumed his usual diet for six wks, and then for the next six wks nearly doubled his daily soluble fiber intake from 5.0 to 9.4 g and total fiber intake from 15.0 to 28.3 g. Fiber in the diet originated from several refined cereal-based products, fruits, vegetables, and a supplement consisting of rice and oat bran. Results showed that serum total CH dropped between 1 and 17%, high-density lipoprotein-CH increased between 3 and 17%, triglycerides dropped between 3 and 46% and glucose dropped between 1 and 9% in participants who responded favourably. Several participants did not respond favourably to one or more of the measurements, and where the response was favourable, it was consistent throughout the six-wk test period only in a few participants. AS

TOXICOLOGY

Nil

FOOD LAWS AND REGULATIONS

GENERAL

39 Best (D). Marketing technology through the looking glass. Activities Report 41(1); 1989; 86-92

40 Bopaiah (BM) and Shama Bhat (K). Influence of season on harvest pattern, pod and bean characters of cacao under areca-cacao mixed cropping system. Indian Cocoa, Arecanut & Spices Journal 12(3); 1989; 79-81

Ripe cacao pods were collected at monthly intervals (March through October) and during lean season (November to February) at bimonthly intervals. Pulp content was higher in beans harvested in wet seasons (July-October) (50.58%) and lower (32.0%) in beans harvested in dry seasons. The cotyledon pH did not vary much but the pulp pH varied from 3.45 to 4.60 in different months. The total soluble solids content of bean showed variation from 13.20 to 15.22% in wet months and 16.6 to 18.8% in dry months. Bean wt. was low in wet season (0.79 to 0.95 g) and the beans were heavier (0.9 to 1.25 g) in dry season. KAR

41 Bowbrick (P). Are price reporting systems of any use ? British Food Journal 90(2); 1988; 65-69

This article will examine public price information systems for horticulture, excluding retail, and ignoring the auction systems of countries like the Netherlands. The analysis is highly relevant to the private systems run by distributors, and for retail price collection. Many of the problems are also incurred by grain and livestock systems. BV

42 Chapman (A). Concept testing. A discussion. British Food Journal 90(4); 1988; 166-171

The aim of this article is to determine the stage within the new product development process where concept development and testing is most likely to occur. The flexibility of the concept testing process is highlighted by examining the validity of its use within the reformulation of products as opposed to being categorised as just a stage in new product development. Aspects of concept development, evaluation and testing are discussed with special reference to the development and reformulation of food products. BV

43 Goldie (FJ). Farley health products-A case study. History. British Food Journal 90(1); 1988; 20-21

44 Goldie (FJ). Thinking about the unthinkable. Disaster management in the food industry. British Food Journal 90(4); 1988; 155-158

2345 Lorna Daly (L) and Beharrell (B). Health, diet and the marketing of food and drink-some theoretical problems. British Food Journal 90(1); 1988; 5-9

This article seeks to address the problem of effective marketing of so-called healthy food and drink by examining the relationship between diet, health and marketing through its social and economic dimensions. BV

2346 Sen Gupta (P). Some simple and quick tests for adulteration in food. Indian Food Packer 43(4); 1989; 24-28

Simple tests to detect some common adulterants in ghee or butter, milk, kohya, edible oils, sweetmeat, legume dals, turmeric, silver leaves, chillies and food colours are described. KAR

2347 Shipley (D), Hooley (GJ) and Wallace (S). The selection of food brand names. British Food Journal 90(1); 1988; 15-19

2348 Taoukis (PS) and Labuza (TP). Applicability of time temperature indicators as shelf life monitors of food products. Journal of Food Science 54(4); 1989; 783-788

A systematic approach that allows the correlation of the response of a Time-Temp. Indicator (TTI) to the consumed and remaining shelf life of a food product exposed to the same variable temp. conditions was developed. The approach was based on kinetic principles and is applicable to a TTI-food system without necessitating side by side testing. The applicability of three major TTI types to the developed scheme was studied. Experiments under several isothermal conditions were conducted and kinetic parameters for the three TTI were determined. All TTI showed an Arrhenius temp. dependence and their calculated activation energies ranged from 10 to 40 kcal/mol. AS

2349 Taoukis (PS) and Labuza (TP). Reliability of time-temperature indicators as food quality monitors under nonisothermal conditions. Journal of Food Science 54(4); 1989; 789-792

Application of time temp. indicators (TTI) is based on response information or kinetic models from isothermal testing. The reliability of such models under variable temp. conditions was systematically studied. Nonisothermal experiments of two types were conducted involving prolonged exposures to high temp. followed by storage at low temp. to study the "history effect", and storage at controlled, sinusoidally varying temp. Three major types of commercial TTI were studied. Results showed that, although some types of TTI exhibit a significant "history effect", the prediction models can be applied satisfactory for the variable temp. storage. AS

FOOD PROCESSING

2350 Berry (MRJr) and Bush (RC). Establishing thermal processes for products with straight-line heating curves from data taken at other retort and initial temperature. Journal of Food Science 54(4); 1989; 1040-1042, 1046

Heat penetration data were obtained at high and low retort temp. (RTs) and at high and low product initial temp. in two can sizes for food products displaying straight-line heating curves in an agitating retort. The extrapolation of data to other RTs was found to be a safe practice for products heating with conduction or significant induced convection. Extrapolating to lower RTs for intermediate viscosity products slightly underpredicted required processing times. The effect of initial temp. was consistent with that found in a previous study for broken-heating products in a still retort, in that heat penetration tests conducted at different initial temp. can have a significant influence on process establishment, depending on the product. AS

2351 Hinton (AJr), Driver (MG), Silverman (GJ) and Taub (IA). Validation of the thermal sterilization of particulates processed at elevated temperatures. Activities Report 41(1); 1989; 39-49

2352 Ibicali (C). A simplified analytical model for thawing time calculation in foods. Journal of Food Science 54(4); 1989; 1031-1036, 1039

A simplified analytical model for the thawing time prediction of simple-shaped foodstuffs was developed. It was assumed in the model that the solution to the unsteady state, unidirectional heat conduction equation with constant thermophysical properties was valid throughout the thawing operation. The latent heat effects were incorporated into effective diffusivity terms defined for the various phases of the thawing operation. The predictions of the model were compared to experimental and numerical data obtained on thawing of infinite slabs, infinite cylinders, and spheres. The level of agreement between the predictions of the present model, and the experimental and numerical data was quite satisfactory. AS

2353 Shore (D). Computer control in food manufacturing processes. Food Science & Technology Today 2(3); 1988; 175-178

Aseptic processing

2354 Sastry (SK). Theoretical calculations for ensuring safe aseptic process design. Activities Report 41(1); 1989; 34-38

Aseptic technology for particulates is currently of great industry interest. One of the important components of safe process design is the mathematical model for heat transfer to particles in continuous systems. Previously published models are reviewed in light of the nature of their assumptions, and future modeling needs and directions are discussed. AS

FOOD PACKAGING

2355 Chatterjea (BD). Emerging trends in food packaging. Indian Food Industry 8(2); 1989; 1-11

Paper deals with the importance of appropriate composites and standards for packaging of different food products not only for domestic markets but also for export. It covers the developmental aspects in three broad phases and gives an out look for the packaging materials and their economics as applied to food processing industry. It deals with different kinds of packaging materials such as LDPE, HDPE, polysucrue, polypropylene, PUC, Nylon, glass containers etc. with their comparative cost structure. GP

2356 Kluter (R). Sensory engineering concepts. Activities Report 41(1); 1989; 72-78

This paper has demonstrated an application of sensory engineering to the development of wet pack fruit for the MRE ration. The process involved careful selection of variables for the study and utilization of minicomputer and personal computer technology and software to design the study, to collect ratings directly from panelists, and to statistically anlyze data. The information yield of the study has been identification of those variables that result in formulation of acceptable peach and pear packs that are stable for a min of 6 months at a stressful storage temp. Key among the findings were that (1) quality of the higher pH fruit, as indicated by slower rates of adverse colour and texture change, held up better than the lower pH fruit, and (2) correspondingly, acceptability of the former was higher than the latter. AS

Containers

2357 Irving (AR). Refrigerated shipping containers. Understanding their operation and using them effectively for the carriage of horticultural produce. CSIRO Food Research Quarterly 48(1); 1988; 1-18

Discusses basic description of container, types of containers, external environment during shipment, air temp. rise and air flow rate, air flow distribution, temp. controller, defrost, container temp. recorder and produce temp., new controllers and recorders, pre-trip inspection, temp. distribution in the produce, independent recorders and monitoring, storage of produce into containers, modified atm. transport, high quality produce at loading and poor quality produce at outturn. BV

FOOD ENGINEERING AND EQUIPMENT

Engineering

2358 Chang (SY) and Toledo (RT). Heat transfer and simulated sterilization of particulate solids in a continuously flowing system. Journal of Food Science 54(4); 1989; 1017-1023, 1030

The heat transfer coeff. (h) between a cube and water were 239 and 303 W//m^2 K at 0 and 0.86 cm/s relative velocity. In 35% sucrose and 0 cm/sec, h was 146 W//m^2 K. A model for heat lethality in cubes during continuous sterilization which used finite differences equations for heat conduction and above values of h, revealed that hold times for 6D inactivation of PA 3679 (F_o = 7.2 min) in an isothermal fluid at 132.2 C were 1.78 and 5.2 min for 1 and 2 cm cubes when h was 303 W//m^2 K and 1.23 and 4.13 min when h was 2500 or higher. When h was 239 W//m^2 K, hold times were 2.36 and 6.02 min for 1 and 2 cm cubes. When fluid entered the hold tube at 132.2 C and particle to fluid ratio was 0.56, fluid-particle heat exchange increased hold time to 12.2 and 119 min for 1 and 2 cm cubes. AS

2359 Morento (J) and Reventos (I). Computerized representation of alveograms using fractional polynomials. Cereal Foods World 34(3); 1989; 276-277

This special report mention the advantages of computer representation of graph in a alveograph using fractional polynomials. PHR

2360 Tayeb (J), Vergnes (B) and Valle (GD). A basic model for a twin-screw extruder. Journal of Food Science 54(4); 1989; 1047-1056

A model based on solving thermal balance and Stokes equation in a co-rotating twin-screw extruder with deep screw channels was developed. The present stage of the model described the evolution of temp. in the conveying section and the isothermal evolution of pressure in the melt pumping and reverse screw elements, with a Newtonian viscosity adapted to each part of the screw; residence time distribution in the whole extruder was also computed. Experimental validation was carried out on a pilot scale twin-screw extruder CLEXTRAL BC 45 fed with maize starch. Good agreement was found between the theoretical and actual temp. and pressure profiles, as well as with residence time distribution. In standard operating conditions (30 kg/h, 200 r.p.m.), the pressure generation in one C-shaped chamber was computed to be about 2.2 MPa, while pressure drops were about 0.3 MPa (intermeshing zone) and 0.5 MPa (reverse screw element) while the major part of the residence time per unit of screw length was spent in the reverse screw element. AS

2361 Wright (BB) and Taub (IA). Noninvasive process monitors for ensuring quality and safety of thermoprocessed foods. Activities Report 41(1); 1989; 10-19

The efficiency and practicality of using TTIs to monitor noninvasively the thermoprocessing of food have been demonstrated. These labels, placed on the outside of the container, respond properly to the kinds of time temp. profiles encountered in commercial retorts by undergoing a change in measured reflectance that can be correlated with the F_0 achieved on the inside. Their sensitivity to temp. is similar to the apparent sensitivity of the microorganisms that must be destroyed to acheive a safe and shelf-stable product; the label-to-label variation in sensitivity is expected to be sufficiently small to ensure consistency to processors that the product is microbiologically safe, thus avoiding overprocessing with its consequent compromise in quality. Since the distribution of F_0 values among each and every container could be ascertained, the processor would also be able to determine if a particular processing procedure, such as computerized process control, would lead to higher quality and less can-to-can variation in quality. The eventual adoption of the TTIs for use with different thermoprocessed ration items, in principle, would lead to better rations at lower cost. AS

Drying

2362 La Rocca (V), Panno (G) and Pignato (L). The vapour compression heat pumps use for foods drying. Industrie Alimentari 28(269); 1989; 241-246 (It).

Exploitation of vapour compression heat pumps for agricultural foods drying, especially where there is an energy policy directed towards an incisive use of electrical power is interesting. After an overview of the mechanism of drying process, attention is focused towards drying processes where exploitation of heat pumps is appropriate. AS

ENERGY IN FOOD PROCESSING

2363 Gilson (PD). Cost energy optimization. Activities Report 41(1); 1989; 20-33

FOOD CHEMISTRY AND ANALYSIS

Chemistry

2364 Chin (KW), Garriga (MM) and Metcalfe (DD). The histamine content of oriental foods. Food and Chemical Toxicology 27(5); 1989; 283-287

Several of the symptoms of scombroid poisoning (i.e. histamine toxicity) resemble those observed in people suffering from Chinese restaurant syndrome. Therefore, the histamine content of representative Chinese cuisine, which included 31 common dishes, 12 condiments and 12 basic ingredients from several sources, was measured using a sensitive and specific radioenzymatic assay. A further enzymatic procedure involving diamine oxidase was used to verify that the substance measured was enzymatic procedure involving diamine oxidase was used to verify that the substance measured was histamine. A total of 184 assays were performed on 57 samples in the study. High levels of histamine were found in the cheeses, which were used as positive controls (863.6 µ g histamine/g blue cheese and 107.4 µ g histamine/g Parmesan cheese), and in some common condiments, including tamari (2392.2 µ g histamine/g samples) and one brand of soy sauce (220.4 µ g histamine/g sample, while four condiments and 16 common dishes contained less than 1 µ g histamine/g sample. Calculations involving representative amounts of food that can be consumed at a typical oriental meal suggest that, in some cases, histamine intake may approach toxic levels. The results are discussed with regard to the possible role of histamine in reactions associated with restaurant meals. AS

Chemistry(Analytical)

2365 Carmen Gutierrez (M), Gomes-Hens (A) and Perez-Bendito (D). Stopped-flow determination of iodide in pharmaceutical and food samples. Analyst 114(1); 1989; 89-92

The iodide-catalysed reaction between cerium (IV) and arsenic (III) has been studied using a modular stopped-flow system. The features of both the stopped-flow and conventional kinetic methods have been compared by using the same instrument. The stopped-flow method has a wider linear range and is faster than the conventional kinetic method and has been applied satisfactorly to the photometric detn. of iodide in pharmaceutical preparations, table salt and cow's milk. The results obtained show that the stopped-flow method is simple, inexpensive and rapid and requires no sophisticated equipment. In addition, its high sampling rate makes it particularly suitable for the routine detn. of iodide. AS

FOOD MICROBIOLOGY AND HYGIENE

Enzymes

2366 Stanton (R). The uses of enzymes in the food industry. Food Science & Technology Today 2(3); 1988; 180-189

Fermentation

2367 Ramesh (MV). Factors affecting recovery of thermostable alpha-amylase from bacterial bran produced under solid state fermentation. Chemie Mikrobiologie Technologie der Lebensmittel 11(5); 1988; 155-159

The degree of extraction of the enzyme increased with the icnrease in the ratio of dry bacterial bran:buffer up to 1:9. The recovery of enzyme was about 12% higher at extraction temp. of 28 C as compared to that at 4 C but the efficiency of the extraction was more or less equal with 5-90 min contact time of dry bacterial bran with the solvent. Among all the solvents employed, distilled water containing 1% glycerine extracted more enzyme. The use of multiple-contact counter-current leaching technique results in 86% extraction efficiency and the higher concn. of the enzyme in the extract. The fermented moist bran dried at 25 C under forced aeration showed higher enzyme activity. The centrifugation of the enzyme extract at 6,000 r.p.m. for 20 min or the filtration leads to the desired degree of clarification. No interference either in the use of the enzyme assay was observed with the use of clarified enzyme extract. AS

Microorganisms

2368 Kilsby (DC) and Kinderlerer (J). Microbiological quality assurance procedures in the food industry. British Food Journal 90(2); 1988; 70

Bacteria

Bacillus

2369 Kuriki (T), Park (JH), Okada (S) and Imanaka (T). Purification and characterization of thermostable pullulanase from Bacillus stearothermophilus and molecular cloning and expression of the gene in Bacillus subtilis. Applied and Environmental Microbiology 54(11); 1988; 2881-2883

A thermostable pullulanase (alpha-dextrin 6 glucose hydrolase) from a newly isolated Bacillus stearothermophilus strain (TRS 128) was purified and characterized. The enzyme hydrolysed (1-6)-alpha-D-glucoside linkage of pullan to produce maltotriose, and the optimum temp. was 65 C. About 90% of the enzyme activity was retained after treatment at 65 C for 60 min. By using pTB 522 as a vector plasmid, the pullulanase gene was closed and expressed in Bacillus subtilis. RJ

Bacillus licheniformis

2370 Bajpai (P) and Bajpai (PK). High temperature alkaline alpha-amylase from Bacillus licheniformis TCRDC-B13. Biotechnology and Bioengineering 33(1); 1989; 72-78

A bacterial strain, Bacillus licheniformis, has been isolated and identified which produces high-temp. alkaline alpha-amylase. Cultural conditions, such as types of carbon and nitrogen sources, temp. pH, and time of reaction, have been optimized for production of alpha-amylase in shake flask and fermenter. The enzyme produced was quite active even at 100 C however, it showed optimum activity at 90 C. It exhibited optimum activity in the broad pH range 5.5-10. The effects of Na^{+} and Ca^{2+} ions on enzyme activity was also studied. AS

Ruminococcus albus

2371 Pavlostathis (SG), Miller (TL) and Wolin (MJ). Fermentation of insoluble cellulose by continuous cultures of Ruminococcus albus.

Applied and Environmental Microbiology 54(11); 1988; 2655-2659

The hydrolysis and fermentation of insoluble cellulose (S) by continuous cultures of Ruminococcus albus 7 was studied. An anaerobic continuous culture apparatus was designed which permitted gas collection continuous feeding, and washing at different retention times. The operation of the apparatus was controlled by a personal computer. Cellulose destruction ranged from Ca 30 to 70% for hydralic retention times of 0.5 to 2.0 days. Carbon recovery in products was 92 to 97% and the oxidation reduction values ranged from 0.91 to 1.15. The total product yield (linomass not included) per gram of cellulose (expressed as glucose) was 0.83 g g^{-1} and the ethanol yield was 0.41 g g^{-1}. The product yield was constant, indicating that product formation was growth linked. RJ

Staphylococcus aureus

2372 Tuncan (EU) and Martin (SE). Combined effect of sucrose and heat treatment temperature on the thermal resistance of Staphylococcus aureus MF-31. Journal of Food Science 54(4); 1989; 936-939

The combined effect of sucrose and heat treatment temp. on the thermal resistance of Staphylococcus aureus MF-31 was examined by determining the relationship between the D value, temp. and each of three parameters (water activity, osmotic pressure and water binding energy) related to sucrose-water binding. The results showed that sucrose and temp. had a significant interactive effect on thermal resistance. More specifically, sucrose increased the heat resistance, and this effect was greater at low temp than at higher temp. The effect of sucrose on the Z value was slight compared to its effect on the D value. AS

Vibrio parahaemolyticus

2373 Sanjeev (V) and Mahadeva Iyer (K). Inactivation of Vibrio parahaemolyticus in drinking water. Fishery Technology 26(2); 1989; 149-150

Drinking water collected from Cochin (kerala State, India) was analysed for pH, total dissolved solids, chlorides, total hardness, temporary hardness, permanent hardness due to Ca and Mg, alkalinity, sulphate, Cu, and Fe. The exposure time of drinking water required to inactivate 90% of the cells (D^{10}) of NCMB-1902 V. P 49 and V.P 56 strains of V. parahaemolyticus are 2.3, 3.4 and 1.6 min resp. KAR

Hygiene

2374 Gilbert (RJ) and Kinderlerer (J). Food-borne infections and intoxications- recent problems and new organisms. British Food Journal 90(2); 1988; 71-72

2375 Subbannayya K), Jyothi Kumari (K), Anoopa Kumar and Shivananda (PG). Entamoeba histolytica and other parasitic infections in food handlers and destitutes. Arogya 15(1); 1989; 27-31

Present study deals with the parastitic fauna of the intestinal lumen of 54 food handlers comprising 28 hotel and 26 hotel mess workers and 53 destitutes, 19 of them from a state home for women and 34 from a certified school. Parasitic infection was found to be very high both in food handlers (79.63%) and destitutes (98.11%). While the prevalence of infection with E. histolytica was 20.04% among food handlers, it was 16.98% among destitutes. The frequency of various other parasites in food handlers in that order were Necator americanus (61.11%), Ascaris lubricoides (48.15%), Entamoeba coli (25.92%), Trichuris trichiura (22.96%), Enterobius vermicularis (7.4%), Iodamoeba beutschii (7.4%), Stronglyloides stercoralis (3.7%) and Giardia intestinalis (3.7%), while A. lumbricoides (77.36%) was the commonest isolate from destitutes, T. trichiura (73.58%), N. americanus (69.81%) and E. coli (39.62%) were the rest that showed high prevalence. The parasites less commonly recovered from destitutes were G. intestinalis (11.32%), Hymenolepis nana (7.55%), I. buetschlii (1.89%) and Ttichomonas hominis (1.89%). The high prevalence of parasitic infestation were correlated with poor personal and environmental hygiene in both groups. All age groups were equally affected. Predominance of single infection in food handlers and multiple infections in destitutes was observed. AS

2376 Veera Babu (GR), Ramesh Reddy (G) and Chetty (CS). Benthiocarb toxicity in rat. Implications of altered protein metabolism. Arogya 15(1); 1989; 53-57

Levels of protein, free amino acid (FAA) and specific activities of acid, neutral and alkaline proteases were estimated in brain and liver of albino rat treated with benthiocarb, an organocarbamate herbicide. The proteins (soluble, insolube and total) decreased, whereas FAA and protease activities increased both at tremorogenic dose (700 mg/kg body wt.) treated for 3 and 24 h and sublethal dose (100 mg/kg body wt.) treated for 1 and 7 d of benthiocarb. The decrease or increase is more pronounced in liver as compared to brain. AS

Bacteria

2377 Wheelock (V). Bacterial food-borne disease. A major issue for the food industries. British Food Journal 90(2); 1988; 58-64

BIOTECHNOLOGY

Nil

FOOD ADDITIVES

Antioxidants

2378 Farag (RS), Daw (ZY), Higazy (A) and Rashad (FM). Effects of some antioxidants on the growth of different fungi in a synthetic medium. Chemie Mikrobiologie Technologie der Lebensmittel 12(3); 1989; 81-85

The antifungal properties of BHT, GHR, TBHQ, and DDG against some sp. of Aspergillus, Penicillium and Trichoderma and the effect of these antioxidants on aflatoxin production by Aspergillus parasiticus in synthetic medium was studied. The results indicated that at certain levels BHT and DDG acted as stimulators of fungal growth and aflatoxin production by Aspergillus parasiticus and BHA and TBHQ acted as inhibitors. BV

Sweeteners

2379 Hussain (RA), Kinghorn (AD) and Soejarto (DD). Sweetening agents of plant origin. Literature search for candidate sweet plants. Economic Botany 42(2); 1988; 267-283

The Latin binomials of a number of plants containing sweet constituents hitherto studied bear epithets that indicate sweetness, such as Acer saccharum, Lippia dulicis, Periandra dulcis, Saccharum officinarum, and Synsepalum dulcificum. Based on this observation, a search for plants bearing epithets that may indicate or relate to the sweetness sensation was carried out, by perusal of Index Kewensis. As a results, a large number of plants were found that bear such epithets. These plants are candidates for future investigation for potential sweet constituents. AS

Aspartame

2380 Stamp (JA) and Labuza (TP). An ion-pair high performance liquid chromatographic method for the determination of aspartame and its decomposition products. Journal of Food Science 54(4); 1989; 1043-1046

The retention behaviour of aspartame and six decomposition products were evaluated as a function of added sulphonic acid ion-pair mobile phase modifiers by HPLC. The separation of aspartame decomposition products was optimized utilizing an isocratic mobile phase of acetonitrile, monosodium phosphate buffer, and 1-heptane sulphonate at pH 3 with UV detection at 214 nm. The effects of ion-pair chain length and mobile phase pH on the separation and quantitation of six aspartame decomposition products were compared to traditional reversed phase methods. The advantage of the described method is a rapid analysis with minimal peak tailing, which is easily mainipulated to maintain the desired resolution as chromatographic conditions change. AS

2381 Singh (N), Chauhan (GS) and Bains (GS). Effect of soy flour supplementation on the quality of cooked noodles. International Journal of Food Science and Technology 24(1); 1989; 111-114

In this paper the results of effect of soy flour supplementation on the quality of cooked noodles were presented. Noodles were prepared from semolina of durum and aestivum wheats and flours of aestivum with or without 10% of different types of full fat soy flour and defatted soy flour. It was seen that cooked wt. and water absorption of noodles have increased with increase in cooking time but decreased with addition of soy solids. The latter also increased losses of total solids and decreased losses of nitrogen into the cooking water. The sensory qualities of noodles indicated that the product made from durum semolina containing 10% of defatted soy flour was as good as that from durum semolina alone. NGKR

Rice

2382 Anuradha (K), Nagalingam (B) and Raghavaiah (G). Relative reaction of rice cultivar to Sitotroga cerealella (Olivier). Bulletin of Grain Technology 27(1); 1989; 8-12

In this paper the results of investigation to find out the relative reaction of 36 rice cv. to Sitotroga cerealella (Olivier) have been presented. These cv. were developed by Andhra Pradesh Agricultural University and their sister Institutes. Among physicochemical characteristics studied were thickness, silica and ash content of husk, alkali spreading values and protein content of kernels, intergranular space and L/B ratio. These were determined by standard procedures. The results showed that nine cv. viz., Gouthami', `Vijayamahsuri' `NLR 9672-76', `Dhanyalakshmi', `Pratibha', `Kottamolagolukulu-72', `WGL 26889', `Kakatiya' and `Vasista' were moderately resistant while 8 var. `Nagavali', `RGL 2831' `RGL 1212', `Rasi', `BPT 8233', `Mahendra', `Srinivas' and `Vajram' were highly susceptible and the remaining 19 cv. were intermediate in their reaction. Thickness silica and ash content of husk were negatively correlated with susceptibility index whereas alkali spreading values and protein content of kernels were positively correlated. The correlation of susceptibility index with intergranular space and L/B ratio were positive but not statistically significant. NGKR

2383 Mohmound (NE), Farra (AA), Fahmy (AH) and El-Sakr (AS). Effect of gamma irradiation of rice grains on some physico-chemical properties of milled rice. Chemie Mikrobiologie Technologie der Lebensmittel 12(3); 1989; 65-68

Physicochemical studies of milled rice obtained from irradiated samples of Giza 154, indicated a highly negative correlation between irradiation doses and gelatinization time of rice flour estimated by visco-amylograph. There was also highly adverse correlation between irradiation doses and the max. viscosity which decreased from 760 Brabender Units (B.U.) for the control to 240 B. U. for the sample irradiated with 500 krad. The viscosity at 95 C and after cooling to 50 C showed a negative correlation too. The study also indicated that the percentage of the damaged starch grains increased as the irradiation dose increased. The effect of irradiation treatments on reducing and non-reducing sugars of milled rice showed an increase in both of them, especially at the dose 250 and 500 krad. Irradiation of rice grains showed no remarkable effect on crude protein for amylose content of the milled rice. AS

2384 Ratna Sudhakar (T), Sreerama Murthy (K) and Narayana Rao (PV). Tolerance of brown plant hopper resistant rice varieties to Sitotroga cerealella Oliv. during storage. Bulletin of Grain Technology 27(1); 1989; 54-56

These studies were taken up to evaluate the relative tolerance of brown plant hopper (BPH) resistant var. of rice to Sitotroga cerealella to find the insect development in relation to certain chemical parameters. Eleven BPH resistant var. of rice obtained from Rice Research Institute, Bapatla (A.P.) in the moisture range of 11.4 to 11.86% were subjected to test insects and data collected on protein, ash, developmental period, index of susceptibility and also correlation between ash and protein contents in BPH resistant rice var. and development of rice weevil. The results indicated that the mean adult emergence, mean developmental period of the grain moth and index of susceptibility differed among var. being significant in a few cases. The test insect took 27.32 to 31.1 days for its development in different var. The index of susceptibility was more with MTU 4870 (10.4) and MTU 5195 (10.4) and less with BPT 856 (6.2) and MTU 5249 (7.2). The protein and ash contents were in the range of 0.34 to 9.90% and 4.59 to 5.49% resp. NGKR

2385 Sood (DR). Comparison of quality characters of `basmati-370' and mutant `HK_2 '`R_{21}' varieties of rice. Bulletin of Grain Technology 27(1); 1989; 52-53

This study presents the comparative data on some quality characters of `Basmati-370' and `mutant HK_2 R_{21}' var. of rice samples were obtained from Haryana Agricultural University, Hisar and polished to 5% and their flours were tested for length-breadth ratio, amylose, protein elongation ratio, swelling ratio, water absorption, vol. expansion, aroma, alkali value by standard procedures. Results confirmed earlier findings that most of the `Basmati' rice var. have high amylose, low protein, lengthwise elongation in cooking, tenderness of cooked rice, presence of aroma, high water absorption and vol. expansion and low alkali digestibility. This study also infers that `mutant HK_2 R_{21} is inferior to `Basmati-370'. NGKR

Wheat

2386 Boyal (RK) and Phoolka (MK). Wheat based extruded products. Indian Miller 19(6); 1989; 54, 56, 59, 62-63

Article describes different types of extruders including pasta extruders, high pressure forming extruders, collect extruders, high shear cooling extruders like single screw and twin screw. Extrusion cooked products described include noodles and pasta products, powders, precooked instant beverage powders, croutons and breadings, crackers and wafers and improved nutritious foods like protein enriched cereal based foods, high fiber foods, vegetable proteins and snack foods. The advantages of extrusion cooking have been listed. KAR

Wheat bran

2387 Gujral (S), Khattar (R) and Mehan (S). Effect of wheat bran on the control of diabetes mellitus in non-insuline dependent diabetic patients. Arogya 15(1); 1989; 16-22

The role of wheat bran on control of diabetes mellitus was investigated in non insulin dependent diabetic patients. The confirmed diabetics selected for the study were between 45 to 73 yrs of age and wt. between 45 to 65 kg. They were placed under a 15 day observation period during which their diet history was collected which revealed that they were consuming a low calorie, adequate fat and high fibre diets. At the end of the post-observation period, 75 g of bran biscuits providing 11 g bran were included in the patients diet for a period of one month. In response to the bran diet the fasting and post-prandial blood and urine sugar levels, and glycosylated haemoglobin concn. decreased significantly. The actual decrease was more pronounced in the post-prandial blood and urine sugar levels than in the fasting levels. In addition to the hypoglycaemic effects, intake of bran biscuits was greater when biscuits were fed for one month period in contrast to when biscuits were fed for a 15 day period. It appeared that inclusion of wheat bran rich foods in diabetic diet would improve their glucose status. AS

Wheat flour

2388 Galloway (GI), Biliaderis (CG) and Stanley (DW). Properties and structure of amylose-glyceryl monostearate complexes formed in solution or on extrusion of wheat flour. Journal of Food Science 54(4); 1989; 950-957

Differential scanning calorimetry (DSC), alpha-amylolysis, and gel filtration chromatography (GFC) were used to characterize the lamellar morphology of solution-grown amylase-glyceryl monostearate (GMS) complexes. The complexes grown at 60 and 90 C had melting temp. of 100 and 114 C. resp. Both enzyme digested complexes had broad overlapping GFC chromatographs; however, the amylose-GMS-90 C complex had chain lengths 25% to 40% larger than the lower temp. complex. Assuming the main GFC peak was representative of the ordered lamellar regions, the complexes grown at 60 and 90 C had helical chain segments of 104 A and 145 A, resp. The influence of GMS addition on the twin screw extrusion of soft wheat flour was also investigated. Formation of a complex during extrusion, characteristic of the amylose-GMS-90 C polymorph, decreased the starch solubility, water holding capacity, enzyme susceptibility and degree of expansive-puffing of the extrudate. AS

Wheat products

Chapathi

2389 Sidhu (JS), Siebel (W) and Bruemmer (JM). Effect of shortening and surfactants on chapathi quality. Cereal Foods World 34(3); 1989; 286-290

Traditionally prepared chapathies become hard in just a few hours after baking, but the addition of shortening (3%), glycerol monostearate (0.5%), or soidum stearoly-2-lactylate (0.5%) to the formula significantly improves their texture and shelf life up to 72 h. Neither of these surfactants when used alone influenced the initial softness, but both noticeably inhibited the firming of chapathies during storage. The use of shortening (3%) in combination with glycerol monostearate (0.5%) produced chapathies which were initially soft and flexible and showed the least amount of firming during 72 h storage. AS

MILLETS

Corn

Ogi

2390 Okoli (EC) and Adeyemi (IA). Manufacturing of Ogi from malted (germinated) corn (Zea mays). Evaluation of chemical, pasting and sensory properties. Journal of Food Science 54(4); 1989; 971-973

The properties of Ogi derived from malted corn using wet and dry milling processes were studied. Residual protein content of malted Ogi was slightly higher than those of Ogi. Malted dry milled Ogi retained a higher protein level. Malted Ogis gave lower amylograph max. viscosities than non-malted Ogis. Other pasting characteristics (starch stability, index of gelatinization and ease of cooking) were not adversely affected by malting in wet milled Ogis. Dry milled malted Ogi had lower stability and index of gelatinization values. Colour, texture and flavour of malted and non-malted Ogi porridges differed ($P > 0.05$). Ogi porridge and paste derived from malted grains using wet milling were acceptable ($P < 0.05$). AS

Pearl millet

2391 Sharma (ML), Dhamadhere (SV), Deole (JY) and Dharpure (SR). Comparative development and losses caused by Khapra beetle, Trogoderma granarium Everts, (Coleoptera: Dermestidae) to different varieties of pearl millet (Pennisetum americanum (L.) Leak) in storage. Bulletin of Grain Technology 27(1); 1989; 35-38

The present study was carried out to selected the resistant var. of pearl millet Pennisetum americanum to Trogoderma granarium Everts. For this ten var.f of the millet were screened and the observations on number of grubs, pupae and adults were taken in whole and broken grains. Per cent damage by the pest was observed in whole grains only. Out of the ten tested var. three viz. `WCC-75' `ICMS-7704' and `ICMS-7805' were seen to be completely free from insect damage. There was also neither loss in wt. nor any development of the pest in whole and broken grains. NGKR

PULSES

Beans

2392 Garcia-Vela (LA) and Stanley (DW). Water-holding capacity in hard-to-cook beans (Phaseolus vulgaris). Journal of Food Science 54(4); 1989; 1080-1081

The effect of pH and ionic strength (IS) of soaking solution on the water holding capacity (WHC) of hard-to-cook (HTC) and control black beans (Phaseolus vulgaris) was evaluated. Beans were soaked 18 h in solutions covering the pH range 1-7 at constant IS (1.0 M) or in solutions ranging in IS from 0.01 to 1.3 M (prepared with either NaCl or CaCl) at pH 7. WHC was significantly reduced in the pH range 3.5 to 5.1 in control beans but the effect was not as pronounced with HTC samples which had a lower WHC at each pH. Solutions prepared with NaCl produced significantly lower WHC values than calcium chloride solutions in the control but not in the HTC beans. WHC values in control beans tended to increase with higher IS, although this effect was not as apparent for HTC beans. AS

2393 Paredes-Lopez (O) and Harry (GI). Changes in selected chemical and antinutritional components during tempeh preparation using fresh and hardened common beans. Journal of Food Science 54(4); 1989; 968-970

A tempeh-type fermented product was prepared from fresh and hard-to-cook (HTC) common beans. Fermentation decreased fat and fiber content and increased soluble solids, total and soluble proteins, soluble carbohydrates and pH of both bean samples. About 12% of solids were reduced during 72 h fermentations. Results suggested that Rhyzopus oligosporus was capable of hydrolyzing the trypsin inhibitor and phytic acid of the substrate. Lectin and tannin contents decreased as a result of treatments applied during substrate preparation. Fresh and HTC beans may be converted by this fermentation technique into products of higher quality. AS

2394 Stanley (DW) and Plhak (LC). Fluorescence intensity indicates bean hardening. Journal of Food Science 54(4); 1989; 1078-1079

Fluorescence microscopy was used to measure the intensity of fluorescent emanation from the cut surface of uncooked bean cotyledons. This parameter correlated significantly with the hardness of soaked cooked beans determined by either compression force of whole beans or the probe force of cotyledons only. This relationship existed whether hardness resulted from varietal differences or elevated storage conditions. Similarly, a significant correlation was found between the fluorescence intensity of isolated cell wall material and bean hardness. These results led to the conclusion that the increase in fluorescence intesity in hard beans may have been due to the accumulation of phenolic compounds within the cell wall and that the procedure developed had potential as a quicker and simpler way to determine bean hardness. AS

Chickpeas

2395 Luz Fernandez (M) and Berry (JM). Rheological properties of flour and sensory characteristics of bread made from germinated chickpea. International Journal of Food Science and Technology 24(1); 1989; 103-110

In this investigation the acceptable substitution levels of addition of chickpea and germinated chickpea flour for preparation of bread have been determined. Rheological properties were measured initially to predict the effect of the flours in bread and the sensory properties of the baked products have been determined by preparation of breads from wheat flour supplemented with 0, 10, 20 and 30% ungerminated or germinated chickpea flour. Using a wheat flour control, Brabender farinograph and viscoamylograph data were recorded. It was seen that Farinograph development and stability times decreased and amylograph peak viscosities increased for all the fortified flours. The sensory properties of the fortified bread did not differ significantly but chick pea loaf fortified with 10% germinated flour did not compare with control. NGKR

Cowpeas

2396 Ogun (PO), Markakis (P) and Chenoweth (W). Effect of processing on certain antinutrients in cowpeas (Vigna unguiculata). Journal of Food Science 54(4); 1989; 1084-1085

Four Nigerian cvs. of cowpeas were analyzed for raffinose, stachyose, phytic acid, tannins, and trypsin inhibitory activity after dehulling, cold-soaking , hot-soaking, and cooking as ewa-ibeji and moin-moin (two popular Nigerian cowpea foods). Dehulling decreased stachyose and removed the tannins. Hot-soaking caused a significant reduction in stachyose and trypsin inhibitor activity. Ewa-ibeji and moin-moin contained similar quantities of antinutrients, except for tannins which were absent in moin-moin. AS

French beans

2397 Ravikanth Sharma (RV) and Bhattacharya (AK). Nutritional basis of resistance in French bean for Trogoderma granarium Everts. Role of heat labile inhibitors. Bulletin of Grain Technology 27(1); 1989; 13-20

In this investigation an attempt was made to study the overall effect of steaming of French beans on growth and development of Trogoderma granarium Everts and the role of heat labile inhibitors. For this study flours of four var. of French bean viz., `Pant Anumpama' `Pusa Parvati' `VL 1' and Contender were subjected to steaming for 0, 5, 10, 15, 30, 45, 60 and 90 min. Results showed that 90 min. steaming was found to be highly effective for all the var. tested except Contender for destroying the heat labile inhibitors. However, in case of contender 60 min. steaming was appropriate for improving the quality of food for the test insect. This proved that heat labile indicators are major chemical barriers in imparting resistance to T. granarium in French bean. NGKR

Green gram

2398 Saroj Jain) and Yadav (TD). Efficacy of deltamethrin, etrimfos and malathion on green gram. seeds against Callosobruchus chinensis (Linn.) and C. analis (Feb.). Bulletin of Grain Technology 27(1); 1989; 39-44

In this study three insecticides viz., deltamethrin, etrimfos and malathion were tested against Callosobruchus chinensis and C. analis to evaluate their comparative efficacy as seed protectants in green gram during storage. The green gram seeds obtained from IARI, New Delhi was adjusted to moisture levels of 10 and 14% and then germinated by mixing with water and storage at low temp. for a wk. The germinated seeds were treated with insecticide dusts and solutions of deltamethrin, etrimfos and malathion at the rate of 1, 5 and 40 p.p.m. resp. Residual efficacy was tested after storage at 10 and 14% moisture in small jute and polyethylene bags for 180 days using adults of C. chinensis and C. analis. It was seen that 1 p.p.m. dusting of deltamethrin gave complete protection against C. chinensis and efficient against internal infestation of C. analis. Seed treated with malathion dust at 40 p.p.m. gave full protection at 10% moisture content against both beetles. Etrimfos at 5 p.p.m. dose could not give protection beyound few months. None of these treatments showed any loss in germination. NGKR

Peas

2399 Krishna Jha.. Effect of natural brine fermentation on selected nutrients and flatulent galactosides of fresh peas (Pisum sativum L). Chemie Mikrobiologie Technologie der Lebensmittel 11(5); 1988; 143-147

In the present investigation, natural brine fermentation of fresh peas was performed at lab. scale with the objective of studying the effect on selected nutrients and flatulent galactosides. The pH and titrable acidity were found to reach a level of 4.1 and 0.33% resp., within 4 wks. An increase of 5.6 and 3.2 folds was observed in case of methionine and lysine, resp., at 1% level of significance. Thiamine and riboflavin both also increased by 1.3 and 1.1 folds at 5% level of significance, resp., while there was no significant change in niacin. At the same time all the four flatulent galactosides viz. raffinose, verbascose, stachyose and ajugose were completely hydrolysed. The fermented peas could be satisfactorily preserved for 1 yr. at room temp. as observed by no development of any ill-smell or undesirable taste and surface growth of fungi which are predominant microflora in spoilage of acidic foods. AS

Pigeon peas

2400 Singh (U), Rao (PV), Seetha (R) and Jambunathan (R). Nutrient losses due to scarification of pigeon pea (Cajanus cajan L.) cotyledons. Journal of Food Science 54(4); 1989; 974-976, 981

Outer layers of cotyledons of pigeon pea cvs C 11 were successively scarified using a Tangential Abrasive Dehulling Device (TADD). Scarification for 0, 2, 4, 8 and 12 min resulted in the removal of 0, 6.7, 12.7, 25.3, and 36.9%, resp., of powder fractions. The cotyledons and powder fractions at each level of scarification were analyzed for chemical composition, including minerals and trace elements, protein fractions, amino acid composition, and trypsin inhibitor activity (TIA). Portein, soluble sugars and ash of the dhal fraction (scarified cotyledons) decreased with increasing scarification time, while starch content increased. Considerable amounts of Ca (about 20%) and Fe (about 30%) were removed by scarification for 4 min, but the process did not adversely affect protein quality in terms of amino acids. Trypsin inhibitors were not removed substantially by scarification. AS

OILSEEDS AND NUTS

Cottonseeds

2401 Hron (RJSr) and Kuk (MS). Acetone extracted cottonseed meals without catty odours. Journal of Food Science 54(4); 1989; 1088-1089

Delintered cottonseed was hulled and flaked. Moisture-adjusted cooked and uncooked samples were either dried or left undried, and all samples were then Soxhlet-extracted with acetone for five h and desolventized. Sensory testing of gruels prepared from the meals indicated that if free moisture was not present during acetone extraction, catty odours were not found in extracted meals. Gas chromatographic analyses of acetone extracted meals showed concn. of 0.3 p.p.m. mesityl oxide and 0.7 p.p.m. diacetone alcohol, believed to be catty odours precursors, in a catty-odourless meal, whereas concn. of 1.6 p.p.m. and 0.8 p.p.m. resp., were found in a product with a catty odour. AS

Groundnuts

2402 Dange (SRS) and Prasad (SR). Aflatoxin production on seeds of selected groundnut cultivars. Bulletin of Grain Technology 27(1); 1989; 60-62

The present study describes screening of selected groundnut cv. for aflatoxin production which helps breeders, technologists and plant pathologists in their resp. fields. Seeds of 15 selected cv. were evaluated for production of aflatoxin B_1 and G_1 by toxigenic strain of Aspergillus flavus by standard techniques. For quantification of aflatoxins spectrophotometric method was adopted. The data after 8 days of incubation at 28 plus or minus 2 C showed aflatoxin production in all the 15 cv. of groundnut. `J-11' cv. showed lowest amount of aflatoxin production (2658 p.p.b.) followed by `Robut 33-1' (6558 p.p.b.), `Var-27' (7030 p.p.b) and Faizapur' (8262 p.p.b.) whereas highest amount of aflatoxins produced on OG-43-4-1' (23956 p.p.b.) followed by TMV-2' (22746 p.p.b) and GAUG-10' (21102 p.p.b). The rest of the cv. had aflatoxin in the range of 10011 to 18906 p.p.b. It may be emphasised that `J-11' is a released cv. and can be adopted in the areas where aflatoxin is a serious problem. NGKR

2403 Sanders (TH), Vercellotti (JR), Blankenship (PD), Crippen (KL) and Civille (GV). Interaction of maturity and curing temperature on descriptive flavour of peanuts. Journal of Food Science 54(4); 1989; 1066-1069

Windrow dried peanuts were separated into five, pod-mescarp colour based maturity classes and mechanically cured with three temp. regimes. Temp. treatments used in the commercial drying operation were ambient air (max. 35 C), ambient + 8.4 C increase, descriptive analysis evaluated peanuts of similar size and roast colour from each maturity stage. Intensity ratings of descriptors roasted peanutty and sweet aromatic were lowest and ratings for fruity fermented, painty, sour, and bitter were highest for immature peanuts cured at the higher temp. AS

Lupins

2404 Aguilera (JM). Protein extraction from lupin seeds. Microstructural aspects and hypothesis of mechanism. International Journal of Food Science and Technology 24(1); 1989; 29-37

2405 Aguilera (JM) and Garcia (HD). Protein extraction from lupin seeds. A mathematical model. International Journal of Food Science and Technology 24(1); 1989; 17-27

The effect of particle size and microstructural modification on protein extraction from defatted lupin was studied. Particles of different sizes (128-1425 u m) from untreated (control), flaked and exploded samples were extracted at pH 8.0-8.5 and different temp. A three-parameter kinetic model as well as a diffusional model were fitted to data. The yield of protein from the surface of particles, and the total extracted protein yield increased as particle size decreased, while the first order rate constant increased slightly or remained constant. Diffusion coeff. varied between 0.5 and 4.5×10^{-12} m^2 S^- and were higher in expolded and flaked material than in the control. The energy of activation for diffusion was 43 KJ mol. Differences in microstructure were studied by scanning electron microscopy. AS

Rapeseeds

2406 Shahidi (F) and Naczk (M). Effect of processing on the content of condensed tannins in rapeseed meals. Journal of Food Science 54(4); 1989; 1082-1083

The condensed tannins of rapeseed meals produced by a two-phase solvent extraction system were determined and compared with those of hexane-extracted meals. Ground seeds were extracted with absolute methanol, 95% methanol, 10% (w/w) ammonia in methanol or 10% (w/w) ammonia in 95% methanol and hexane as a second phase. Tannins were extracted with 70% (v/v) aqueous acetone and assayed by the 0.5% vanillin methodology. Methanol alone extracted only 16% of the tannins addition of 5% (v/v) water to methanol increased the efficiency of tannin extraction to 36%. The methanol-ammonia water/hexane, however, was the most effective solvent system for the removal of tannins. The resultant meals contained from 4% to 33% of the condensed tannins which were originally present in rapeseed meals. AS

Soybeans

2407 Che Man (YB), Wei (LS) and Nelson (AI). Acid inactivation of soybean lipoxygenase with retention of protein solubility. Journal of Food Science 54(4); 1989; 963-967

The use of acids to inactivate lipoxygenase in soybeans with retention of protein solubility was investigated. Inactivation of lipoxygenase was found to be irreversible when treated at pH 3.0 and below, irrespective of the acids used. The SDS-PAGE patterns showed the disappearance of lipoxygenase bands when soybeans were acid-treated at pH 3.0 and below. Acid treatment showed no effect on trypsin inhibitor and 60% trypsin inhibitor activity was removed by whey separation. Activity of urease was reduced to below 0.2 pH, when lipoxygenase was inactivated. PDI's of 70-76% were retained in the neutralized full-fat soy flour after treatment with acids at about pH 3.0 while full-fat soy material was 52-55%. AS

2408 Hafez (YS), Mohammed (AI), Perera (PA), Singh (G) and Hussein (AS). Effects of microwave heating and gamma-irradiation on phytate and phospholipid contents of soybean (Glycine max L.). Journal of Food Science 54(4); 1989; 958-962

The effect of microwave heating and gamma irradiation treatments on P compounds of soybean seeds were studied. Inorganic P was significantly ($P < 0.05$) increased while, phytate and phospholipids were significantly decreased when soybean seeds were microwave-heated for 9 min or more. Furthermore, gamma-irradiation treatments of 20 KGy or more significantly increased inorganic P and decreased phytate and phospholipids of the beans. Two dimensional thin-layer chromatography was employed to study the phospholipid pattern. Gamma-irradiation at doses from 40 to 100 KGy produced lysophosphatidylcholine and phosphatidic acid. The data of this study showed that, the increase of inorganic P was mainly due to the decomposition of phytic acids and phosphates of inositol. AS

2409 Khan (R), Stehli (D), Wei (LS) and Steinberg (MP). Activity and mobility of water in sweetened whole soy concentrates and their rheological properties. Journal of Food Science 54(4); 1989; 931-935, 946

Intermediate moisture systems were formulated with dehulled, blanched soybeans and four nutritive sweeteners (sucrose, glucose, fructose, sucrose/glucose). Soy content and sucrose/water ratio were varied. Water activity, water mobility (NMR) and rheological properties were determined. All three parameters were strongly influenced by the sweetener. All samples showed non-Newtonian behaviour. Soy content and sucrose/water ratio had a stronger influence on rheology than on water properties. AS

TUBERS AND VEGETABLES

2410 Nguyen-The (C) and Prunier (JP). Involvement of pseudomonads in deterioration of `ready to use' salads. International Journal of Food Science and Technology 24(1); 1989; 47-58

In this paper the results of investigation of microorganisms involved in the deterioration of ready-to-use salads are presented. It is seen that bacteria able to cause soft rot of endive (Chicorum endiva) leaves are frequently found. These soft rot bacteria are fluorescent pectinolytic pseudomonads specifically Pseudomonas marginalis which is the most frequently isolated Pseudomonas sp. and present in the greatest numbers in stored ready to use salads. There is a relationship between the incidence of ready to use salads deterioration and the count of P. marginalis after 10 days of storage at 10 C. Erwinia herbicola is found to be the next most commonly isolated organism. NGKR

Root vegetables

Carrots

2411 El Gendi (SH). Chemical evaluation of carrot seed. Crasas Y Aceites 39(6); 1988; 343-347

Some physical and chemical properties of the essential oils of two var. of Carrot seeds were determined. The essentials oils composition were fractionated by GLC into 16 substances of which 13 compounds were characterized, representing 94.1% - 95.7% of the total volatile components. The most prevalent volatile compounds were carotol, daucol, and beta-bisabolene. After distillation the volatile oils, the fixed oil was extracted and examined, using analytical procedures and GLC analysis. Major physico-chemical constants were determined. GLC fractionation revealed the presence of 12 identified fatty acids. The unsaturated fatty acid represented 81.63%-84.95% of the total fatty acids. Oleic acid (18:1) was the most predominant unsaturated fatty acid and linolenic (18:3) was the second major fatty acid and the third was palmitic acid (16:0). Special interest was given to study the general chemical composition of the residues which remains after extraction of volatile and fixed oils (Marc). The results showed that the marc was characterized by having moderate amounts of protein, carbohydrates and minerals. AS

Carrots

2412 Heil (JR) and McCarthy (MJ). Influence of acidification on texture of canned carrots. Journal of Food Science 54(4); 1989; 1092-1093

Texture of acidified canned carrots was evaluated using shear compression procedure. Carrots canned with as little as 0.77% gluconic acid in the brine retained firmer texture than those packed without acid. Softening phenomena of acidified carrots do not appear to be consistent with a two substrate first order rate expression model. AS

Tubers

Potatoes

2413 Garrote (RL), Silva (ER) and Bertone (RA). Effect of surface freezing on ascorbic acid retention in water blanched potato strips. Journal of Food Science 54(4); 1989; 1090-1091

The average retention of ascorbic acid in potato strips (10 x 10 x 80 mm) blanched in water at 50 C and 65 C over various blanching times, with and without surface freezing pre-treatment was determined. The strips were frozen in Freon Freezant-12 for 15 sec, with the freezing front penetrating 0.4-0.5 mm. Average retention of ascorbic acid in the surface-frozen potato strips was significantly lower than that in fresh strips and lower at 65 C than at 50 C. At an equal average retention of ascorbic acid, at 50 C the fresh strips required a blanching time four times higher than that for the surface-frozen strips; at 65 C it was twice as high. AS

Potatoes

2414 Hadjidemetriou (DG). Persistence of pirimiphos-methyl in stored potatoes. Bulletin of Environmental Contamination and Toxicology 41(2); 1988; 299-303

2415 Matheis (G). Polyphenoloxidase and enzymatic browning of potatoes (Solanum). III. Recent progress. Chemie Mikrobiologie Technologie der Lebensmittel 12(3); 1989; 86-95

This review highlights recent progress on polyphenoloxidase from potatoes (Solanum tuberosum and S. berthaultii). Aspects covered include polyphenoloxidase (mol. wt. substrate specifity, pH optimum, kinetic constants, inhibitors, heat stability, multiplicity, isoelectric points, reaction mechanism and physical function) and enzymatic browning (extrinsic factors contributing to the rate of browning, and control of browning). 51 references. BV

2416 Mondy (NI) and Gosselin (B). Effect of irradiation on discolouration, phenols and lipids of potatoes. Journal of Food Science 54(4); 1989; 982-984

The effect of two irradiation doses, 10 and 100 krad, on discolouration, phenolic content and lipid content of Katahdin' and `Russet Burbank' potatoes was studied. Potatoes were stored 1, 4 and 26 wk at 5 C and 20 C following irradiation. Irradiation increased discolouration and phenols and decreased crude lipids and the phospholipids. Potatoes receiving 100 krad dose discoloured more, were higher in phenols, and lower in lipids than those given 10 krad dose. Potatoes stored at 5 C discoloured more and were higher in phenols and in lipids than those stored at 20 C. Increased storage at both temp. resulted in greater discolouration, increased phenolic content and decreased lipids content. AS

2417 Tomasula (P) and Kozempel (MF). Diffusion coefficients of glucose, potassium and magnesium in marine Russet Burbank and marine Katahdin potatoes from 45 to 90 C. Journal of Food Science 54(4); 1989; 985-989, 1046

Experimental data for the leaching of glucose, K and Mg from French fry cut Maine Russet Burbank and Maine Katahdin' potatoes were modeled over the temp. range 45-90 C, using a one-parameter diffusion equation based on Fick's second law. Correlations for the dependence of the resulting effective diffusion coeff. on temp. were determined. At temp. greater than 60 C, plots of the diffusion coeff. as a function of temp. showed a change in slope or a discontinuity in the slope of the curve. This reflected the change in the diffusion matrix which occurred when the starch began to gelatinize. The effect of cvs differences on values of the diffusion coeff. might be linked to the concn. of starch and electrolytes in the potato. AS

· Vegetables

Cauliflowers

2418 Forney (CF), Rij (RE) and Ross (SR). Measurement of broccoli respiration rate in flim-wrapped packages. HortScience 24(1); 1989; 111-11?

The objective of this study was to determine if respiration rises of broccoli could be determined by monitoring the exchanges of gases into and out of package and therefore allow measurements of the effects of wrapping on produce respirative patarn. The rate of oxygen consumption and carbon dioxide production by the produce samples held in CA or in films at different temp. were presented. BAP

Okra

2419 Sarkar (SR), Singh (LR), Uniyal (BP), Bhatnagar (VS), Mukherjee (SK), Nagpal (KK) and Sharma (SK). A preliminary study on goitrogenic action of lady's finger (Hibiscus esculentus in rats. Arogya 15(1);

1989; 76-79

FRUITS

2420 Ayoub (JA), Driver (MG) and Taub (IA). Use of ethylene absorbers in extending shelf life. Activities Report 41(1); 1989; 93-98

These studies inidcate that ethylene absorbing blankets containing alumina coated with potassium permanganate should be used in all fruit and vegetable storage areas to ensure max shelf life at an affordable cost. Many ships and commands in the Navy are successfully using the blankets. When the CID is in the system, the cost of the blankets will be reduced due to centralized purchasing. AS

Apples

2421 Chen (PM), Varga (DM), Mielke (EA) and Drake (SR). Post-storage behaviour of apple fruit after low oxygen storage as influenced by temperature during storage and in transit. Journal of Food Science 54(4); 1989; 993-996

`Delicious', `Newton' and `Granny Smith' apples (Malus domestica Borkh.) maintained acceptable flesh firmness and high levels of titratable acids and soluble solids after 9 months of storage in 1% oxygen at either 0 C or 3.3 C. Low-oxygen-stored `Delicious' were kept at 0 C for 6 wk without developing physiological disorders before or after 8 days of ripening at 20 C. Storage at 3.3 C caused `Delicious' to soften faster during 6 wk of post-storage holding plus 8 days of ripening. `Newton' apples developed flesh browning and alcohol flavour after 9 months of low oxygen storage at 0 C. `Newton' fruit stored at 3.3 C developed only minimal incidence of flesh browning and alcohol flavour. `Granny Smith' fruit were free from scald, core flush, flesh browning and alcohol flavour after low oxygen storage, regardless of storage temp. However, core flush and flesh browning appeared when `Granny Smith' were kept for 6 wk at 0 C plus 8 days at 20 C. AS

2422 Sapars (GM), Hicks (KB), Phillips (JG), Garzarella (L), Pondish (DL), Matulaitis (RM), McCormack (TJ), Sondey (SM), Seib (PA) and Ei-Atawy (YS). Control of enzymatic browning in apple with ascorbic acid derivatives, polyphenoloxidase inhibitors and complexing agents. Journal of Food Science 54(4); 1989; 997-1002, 1012

Novel browning inhibitors were evaluated in raw apple juice and on the cut surface of apple plugs, using quantitative measurements of colour changes during storage to assess treatment effectiveness. Ascorbic acid-2-phosphate (AAP) and -triphosphate (AATP) showed promise for cut surfaces but were ineffective in juice. Ascorbic acid-6-fatty acid esters showed anti-browning activity in juice. Cinnamate and benzoate inhibited browning in juice but induced browning when applied to cut surfaces. Combinations of beta-cyclodextrin with ascorbic acid (AA), AAP or ascorbyl palmitate were effective in juice but not on cut surfaces. Combinations of AA with an acidic polyphosphate were highly effective with both juice and cut surfaces. AS

2423 Singh (SP), Nirankar Nath and Singh (RP). Standardization of a simple process for apple-cloth. Indian Food Packer 43(5); 1989: 17-23

Method for preparing apple-cloth (fruit bar) has been standardised. The process involves peeling, boiling peels and cores in water, adding its filtrate to water for cooking slices , pulping, adjusting total soluble solids to 25% with cane sugar, correcting the acidity to 0.3% with citric acid, adding 0.175% potassium meta bisulphate and drying the product for 15 h at 60 plus or minus 1 C in tray drier. The dried product had 23.8% moisture, and water activity of 0.757. The mean sensory score was 6.95. The product contained 919 p.p.m. of sulphur dioxide and its colour and sensory qualities were retained well during 6 months storage at room temp. KAR

Apricots

2424 Chtarra (AB), Labavitch (JM) and Kader (AA). Canning-induced fruit softening and cell wall pectin solubilization in the `Patterson' apricot. Journal of Food Science 54(4); 1989; 990-992, 1046

The canning of slightly immature `Patterson' apricot fruits leads to an immediate softening of the halves to the extent that many are of unacceptable texture. This softening occurs in conjunction with a substantial solubilization of uronic acid-, arabinose-, and galactose-rich (presumably pectic) polysaccharide material into the canning liquid. The solubilization is not accompained by pectin depolymerization suggesting that some process other than acid-catalyzed polymer hydrolysis is responsible for fruit softening during processing. AS

2425 Lal (BB), Joshi (VK) and Sharma (R). Physico-chemical and sensory evaluation of sauce and chutney prepared from wild apricot (Chulli) fruit. Indian Food Packer 43(4); 1989; 13-16

Sauces were perpared from Chulli pulp alone and in combination with 25% and 50% tomato pulp. Of these preparations the 1:1 ratio chulli sauce with tomato puree was rated best and was comparable to sauce from tomato alone in sensory characteristics. Chutney (an indigenous sauce like product) was prepared from wild and cultivated apricots. Both the chutneys were comparable and the chulli chutney was indistinguishable from that of cultivated in quality attributes. These products are acceptable even after storage of one yr at ambient temp. when added with 150 p.p.m. of sodium benzoate and 100 p.p.m. of potassium metabisulphate and packed in sterilized glass jars. KAR

Bananas

2426 Corazzi (L), Azzi (A) and Usai (A). Characteristics of chilled "commercially ripe" bananas. Industrie Alimentari 28(269); 1989; 259-262 (It).

Qualitative characteristics of commercially ripe chilled bananas are indicated. BV

Grapes

2427 Lee (CY) and Jaworski (A). Major phenolic compounds in ripening white grapes. American Journal of Enology and Viticulture 40(1); 1989; 43-46

The concn. of hydroxycinnamic acid tartrates, flavan-3-ols, and oligomeric procyanidins in ripening white grape cvs grown in New York were analyzed during the 1986 and 1987 seasons. During maturation of grape berries, hydroxycinnamic tartrates decreased continuously to a low concn. at harvest, while flavan-3-ols, procyanidins, and their gallates increased sharply at veraison and then decreased to their lowest concn. at harvest. Significant seasonal and cultivar variations in the amounts of phenolic compounds during ripening were noticed. A larger quantity of hydroxycinnamic tartrates was found in berry skin than in the flesh, while larger quantities of flavan-3-ols and procyanidins were observed in the berry flesh. These findings partially explain the differences in browning potential of grapes in relation to cvs and seasonal variations, free-run juice, and hard-pressed juice. AS

Guava

2428 Murari (K) and Verma (RA). Studies on the effect of varieties and pulp extraction methods on the quality of guava nectar. Indian Food Packer 43(5); 1989; 11-15

Cold and hot methods of pulp extraction on the quality of guava nectar prepared from `Chittidar', `Allahabad Safeda', Lucknow-49' var. of guava have been studied. Although pulp recovery was increased by 5-8% more in hot extraction, but it developed pink/brown pigment which further increased during storage. The nectars prepared from cold extracted pulp had better colour, flavour and ascorbic acid content (38.85 mg/100 g) and organoleptically acceptable than that of hot extracted pulp. Cold pulp nectars from Lucknow-49 gave a beverage of highest ascorbic acid content (38.85 mg/100 g), optimum relative viscosity (3.0 sec/50 cc) and least development of brown pigments. On storage upto six months at ambient temp., the nectar samples, irrespective of var. and method of pulp extraction, a sharp decline in all the constituents occurred. The decrease in ascorbic acid was 40-50% of the original value. KAR

Mangoes

2429 Charanjit Kaur Sahni) and Khurdiya (DS). Physico-chemical changes during ripening in Dashehari, Chausa, Neelum and Amrapali mango. Indian Food Packer 43(5); 1989; 5-10

Mango var. `Dashehari', `Chausa', `Neelum' and `Amrapali' were allowed to ripe at room temp. (35.9-36.9 C) and cool chamber (cc)

(23.8-27.6 C) for 12-18 days depending upon var. and were analysed at an interval of 3 days for the physical and chemical changes. Among the fruits max. sp. gr. was found with `Amrapali' (1.0602) followed by `Chausa' (1.0484), `Dashehari' (1.0484) and `Neelum' (1.0401). Decrease in sp. gr. of fruit during ripening was slow in those stored at cc. `Neelum' always maintained firm texture during ripening. Soluble solids content was max. in `Chausa' and `Dashehari' (24%) followed by `Amrapali' and `Neelum' (20%). The ascorbic acid values were highest in `Chausa' followed by `Neelum' `Amrapali' and `Dashehari'. The retention of ascorbic acid was found to be better in fruit ripened in cc. Max. beta-carotene was found in `Amrapali' followed by `Dashehari', `Chausa' and `Neelum'. The reducing sugars were max. in `Amrapali' followed by `Neelum', `Dashehari' and `Chausa'. KAR

2430 Prasad (A) and Nalini (K). Investigations on post-harvest physiological changes and quality parameters in mango varieties. Indian Journal of Horticulture 54(3-4); 1988; 235-240

Eight mango var. (`Bangalora', `Bombay Green', `Bombay Yellow', `Khasul-Khas', `Lucknow Safeda', `Fajari', `Amrapalli', `Mallika') were examined in 1981-82 and 1982-83 for physical (fruit size, wt., vol., skin wt., sp. gr. and colour) and chemical (total soluble solids, ascorbic acid, acidity, sugars, pH, protein and flavour) characteristics after harvest. Fruit wt., fruit size and fruit vol. were highest in `Bangalora' var. Fruit size, wt. and vol. showed a positive correlation. Sp. gr. of 1.03, 1.02, 1.02 and 1.02% was observed in `Khasul-khas, `Lucknow Safeda', `Bombay Green' and `Mallika' in 1981-82. Total soluble solids content was highest in `Bombay Green' (21.05 and 21.18% in 1981-82 and 82-83 resp.). Max. reducing sugar 7.45 and 7.11% (`Bangalora') and 6.79 and 6.48% (`Mallika') was found in 81-82 and 82-83 resp. Ascorbic acid, acidity and reducing sugar exhibited a close positive correlation. `Mallika' had a high pH of 4.93 and 5.07 in 81-82 resp. Highest ash content of 1.29 and 1.27% was found in `Bombay Green' in 81-82 and 82-83 resp. Crude fibre content was highest in `Fajari' (2.43 and 2.53% in 81-82 and 82-83 resp.) `Bombay Green' contained highest oil (16.12 and 16.00% in 81-82 and 82-83 resp.). KAR

2431 Tandon (DK), Kalra (SK) and Singh (BP). Ripening pattern of specific gravity graded `Dashehari' mangoes. Indian Journal of Horticulture 45(3-4); 1988; 219-224

`Dashehari' mangoes were harvested and graded into < 1.0 sp. gr. (Gr. I), 1.0 to 1.02 sp. gr. (Gr. II) and > 1.02 sp. gr. (Gr. III). The fruits of Gr. I were the biggest while Gr. III the smallest. The fruits were ripened under ambient conditions (29-35 C and 75-65% R.H.) over 11 days and evaluated for % marketable fruits and physiological loss in wt. (PLW) of fruits. It was observed that the Gr. III fruits ripened the earliest within 5 days and their shelf life was less as compared to the fruits of Gr. I and GR II. Grade I mangoes ripened with better quality and shelf life and retained some marketability even after 11 days of storage. The development of carotenoids and rate of depletion of starch was rather slow in Gr. I fruits and so was senescence as compared to Gr. II and Gr. III fruits. It is concluded that Dashehari mangoes with > 1.0 sp. gr. do not have any advantage as they are prone to higher physiological loss in wt. senescence and other losses. Changes in soluble solids content, titratable acidity, vitamin C content, total carotenoids and starch contents were recorded during the 11-day ripening period in all the grades of fruits. KAR

Peaches

2432 Ghanshyam Sud Ramesh (KN). Effect of CCC (cycocel) on the shelf-life of peach cv. `Opulent'. Indian Food Packer 43(4); 1989; 5-7

Peach cv. Opulent was treated with cycocel at 4000, 3000, 2000 p.p.m. levels and tap water and stored at room temp. for 7 days. The fruits were firm upto 5 days of storage and the 400 p.p.m. dose was found best to resist the fruit softening. The % of TSS decreased with increased dose of cycocel and TSS was max. in control. The % of sugar was high in control and declined with enhanced cycocel concn. Higher level of acidity was noticed in cycocel treated fruit than the control fruit. VKR

CONFECTIONERY, STARCH AND SUGAR

Cocoa

2433 Silwar (R). Gas chromatographic-mass spectrometric investigation of cocoa aroma. Quantitative determination of steam-volatile aroma constituents. Cafe-Cacao-The 32(3); 1988; 243-249

The steam-volatile constitutents of roasted cocoa aroma were isolated and enriched via standard-controlled simultaneous distillation-extraction (SDE) with organic solvents. The aroma extract was separated adsorption-chromatographically (on silica gel according to increasing polarity of the components) into six fractions, and the fractions were investigated by means of capillary gas chromatography and capillary GC-mass spectrometry. Using this method, about ten components in the p.p.m. range (1-40 p.p.m) and about ninety components in the p.p.b. range (10-500 p.p.b.) were identified and quantified. These components make up 85 to 90% by wt. of the steam-volatile aroma complex, which amounts to 85 to 110 p.p.m. in roasted Ghana cocoa. The most common classes of compounds detected were hydrocarbons, aldehydes, ketones, acids, esters, furans, and pyrazines. The major constituents of cocoa aroma are 2-phenyl-acetaldehyde, tetramethylpyrazine, benzaldehyde, 2-phenylethanol, and isovaleric acid. Fourteen components were identified for the first time as cocoa volatiles. AS

2434 Harrigan (KA) and Breene (WM). Fat substitutes. Sucrose esters and simplesse. Cereal Foods World 34(3); 1989; 261-267

In this feature article the family of sucrose esters including the low ester forms that function as dough conditioners, emulsifiers and surfactants among others as well as the higher ester forms which can replace fats and oils in drying and as shortening. Simplesse, a new fat substitute made from milk proteins or egg whites by a process known on microparticulation, is also discussed briefly. PHR

2435 Vaisey-Genser (M) and Ylinmaki (G). Baking with canola oil products. Cereal Foods World 34(3); 1989; 246-258

This features article deals with canola oil, which is the Canadian registered name of a genetically-modified product of rapeseed. The article includes market performance of the oil, its physical characteristics and suitability for use in cakes, yeast bread, and cookies. Canola oil was found to be as good as other bakery shortening-lard. PHR

2436 Wringley (CW), Gras (PW), Russ (A), Rath (CR), Hibberd (GE) and Walker (CE). Microprocessor controlled equipment for quantifying sprout damage characterizing starch properties and determining dough properties. Cereal Foods World 34(3); 1989; 277-279

This article describes improved equipment for testing cereal grains and their products testing for sprout damage due to rain at harvest is done by using the microprocessor-controlled rapid visco-analyzers (RVA) to determine the apparent viscosity changes accompaining samples heating and thus the content of amylase action on endosperm starch. Two grass flour dry mixes developed are found to determine the mixing characteristics. PHR

Bread

2437 Krishnakumar (P) and Ghosh (D). Raw materials used in bread industry-role and present scenario. Indian Miller 19(6); 1989; 33-51

This is a general article which deals with wheat flour (Maida) qualities for bread making such as protein/gluten, water absorption power, starch and damaged starch, particle size, enzymes, ash content, acid insoluble ash, and rope spore count. An appraisal of the quality of wheat flour available in Indian markets and methods to overcome certain common defects have been indicated. Other aspects covered include role of baker yeast; salt; and water; sugar and fat in bread making and the choice of packaging materials for packing bread. KAR

2438 Krog (N), Olesen (SK), Toernaes (H) and Joensson (T). Retrogradation of the starch fraction in wheat bread. Cereal Foods World 34(3);

1989; 281-285

The effects of monoglycerides and of the diacetyl tartaric acid ester of monoglycerides (DATEM) on starch retrogradation in bread. were studied by measuring crumb firmness over a seven-day period at 22 C with the Instron Universal Testing Machine (UTM) and also by monitoring starch retrogradation by differential scanning calorimetry (DSC). Firmness increased over the storage period to a value about 10 times higher than that of the fresh crumb. Addition of monoglycerides or DATEM reduced the rate of increase in firmness in proportion to their concn. in the flour. The first DSC endothermal peak between 50 and 80 C (said to be from retrograded amylopectin) increased in delat H value from 0.39 to 1.33 J/g over the same storage period. Assuming a max. delta H value of 2.7 J/g for the retrogradable amylopectin, the 1.33 J/g value corresponds to about one-half the amount of amylopectin which can retrograde. Addition of 1% monoglycerides reduced the peak to almost 0 in fresh bread, and potentially after storage. The second DSC peak between 100 and 125 C (said to represent disassociation of amylose-lipid complex) gave a delta H value of that complex of 0.8 J/g in the control bread and 2.90 J/g with 1% monoglycerides. DATEM effects on DSC measurements were less than those of monoglycerides. It was concluded that the crystallinity of amylopectin in bread plays an important role in the development of firmness. Monoglycerides interact primarily with the free soluble amylose in the dough, increasing the content of amylose-lipid complex. DATEM is less effective than monoglycerides in reducing amylopectin retrogradation and also in forming amylose-lipid complex. However, it appears to reduce crumb firmness by contributing to changes in cell wall thickness and elasticity. Combinations of monoglycerides and DATEM give optimum reductions of firmness over long storage periods. AS

2439 Peleg (M), Roy (I), Champanella (OH) and Normand (MD). Mathematical characterization of the compressive stress strain relationships of spongy baked goods. Journal of Food Science 54(4); 1989; 947-949

The compressive stress-strain relationships of selected breads, English muffins and sponge cake were determined with a Universal Testing Machine and described mathematically in terms of three-parameter empirical model. These parameters gave account of the overall mechanical resistance of the sponge, the existence of a shoulder in its stress-strain curve and the strain level at which densification of the sponge becomes the dominant deformation mechanism. They were also sensitive indicators of the changes that were observed in the stress-strain relationship as a result of successive compression and could be used to distinguish between the deformation patterns of the various products. AS

2440 Ranhotra (GS) and Gelroth (JA). Effect of calcium level on bread iron utilization by iron deficient rats. Journal of Food Science 54(4); 1989; 943-946

Utilization of Fe in bread containing variable amounts of Ca was examined using Fe-deficient rats as the level model. Fe was added to the bread at the normal enrichment level. Ca, however, was added at levels up to 9 times the normal level. Fe utilization efficiency (IUE) was calculated based on collective increases observed in hemoglobin and liver Fe. Compared to a diet low in both Ca and P (IUE = 100%), IUE averaged 98% when the diet was high in Ca but moderate in P, and 78% when the diet was very high both in Ca and P. Viewed collectively, the data suggested that excessive intake of both Ca and P would adversely affect the utilization of Fe in bread, but some excess of Ca alone would not. AS

2441 Rastogi (A) and Gurmukh Singh). Effect of addition of full fat soy flour of different varieties on quality characteristics and breadmaking quality of wheat flour. Bulletin of Grain Technology 27(1); 1989; 26-34

This study was undertaken to observe the effect of addition of full fat soy flour (FFSF) on the quality characteristics and breadmaking quality of wheat flour. Wheat flour was prepared from wheat procured from Crop Research Centre of Pant University, Pantnagar, U.P. and FFSF was prepared from five var. of soybeans. For preparation of blends flour and FFSF of different var. were mixed separately in proportion of 95:5, 90:10, 85:15 and 80:20 and were kept in airtight containers. Fat, gluten, sugars pigments and sedimentation values of blends and wheat flour were determined by AACC methods. Protein was determined by micro-Kjeldahl method; Pelshenke values by Welsh and Normann, colour in Kent Jones colour grader; breadmaking quality by standard methods. Results showed that blends varied in quality parameters and also the prepared bread in their loaf wt. vol. and sensory quality. It was seen that satisfactory quality bread could be produced at 5% level of FFSF. At higher levels the acceptability was reduced due to poor texture of the crumb and undesirable flavour of the bread. NGKR

MILK AND DAIRY PRODUCTS

2442 Bevilacqua (AE) and Califano (AN). Determination of organic acids in dairy products by high performance liquid chromatography. Journal of Food Science 54(4); 1989; 1076-1077, 1079

A high performance liquid chromatographic method was developed for the quantitative analysis of organic acids in dairy products. A reverse-phase C8 column at room temp., a mobile phase of 0.5% w/v buffer (ammonium phosphate at pH 2.24 with phosphoric acid) 0.4% v/v acetonitrile, UV detection at 214 nm and 1.2 mL/min flow rate were utilized. Formic , acetic, pyruvic, propionic, uric, orotic, citric, lactic and butyric acids were quantitated for raw milk, yoghurt, Blue, Provolone, Port Salut and Quartirolo cheeses. Recoveries greater than 85.3% were observed for all acids. AS

2443 USFDA and Milk Industry Foundation Inter. Ice Cream Association. Recommended guidelines for controlling environmental contamination in dairy plants. Dairy and Food Sanitation 8(2); 1988; 52-56

Milk

444 Buning (PH), Eggers (R) and Bartsch (A). Comparison of milk fat fractions obtained by crystallization with those obtained in a continuous fractionation process using super-critical carbon-dioxide. FAT Science and Technology 91(3); 1989; 92-99 (De).

Milk fat fractions, obtained by supercritical carbon dioxide fractionation, have been investigated by GC, HPLC and DSC. The effect of component fatty acids in glycerides over the crystallization behaviour have also been studied. N

445 Chander (H), Batish (VK), Babu (S) and Singh (RS). Factors affecting amine production by a selected strain of Lactobacillus bulgaricus. Journal of Food Science 54(4); 1989; 940-942

Lactobacillus bulgaricus-52 showed max. growth and amine production in MRS broth in 24 h at 37 C. The optimum pH for the production of histamine, tyramine, and tryptamine by L. bulgaricus-52 was 5.0. Highest yields of the different amines were obtained in the absence of NaCl in the growth medium. A concn. of even 0.5% NaCl had a slight inhibitory effect on the synthesis of amines. A similar trend was observed in terms of amine production by L. bulgaricus-52 in milk samples held at 37 C for different time intervals. AS

446 Kim (BY) and Kinsella (JE). Rheological changes during slow acid induced gelation of milk by D-glucono-delta-lactone. Journal of Food Science 54(4); 1989; 894-898

Alteration in the rheological behaviour of milk during acidification were studied. Structure formation during gelling was monitored by a small strain rheological scanner. Dynamic viscoelastic properties were monoitored as a function of time and temp. Time of onset of gelation, rate of network formation and development of the elastic component during acidification were accelerated at higher temp. (55 C). Addition of Ca (0-40 mM) facilitated gelation. Preheating milk at 90 C for 5 min prior to acidification enhanced gelation and induced protein-protein network formation. The number of strength of elastically effective bonds between protein molecules were reduced and gels of lower firmness were obtained with preheated milk, compared to gels made from unheated milk. AS

447 Larsen (RF) and Anon (MC). Interaction of antibiotics and water activity on Streptococcus thermophilus and Lactobacillus bulgarius. Journal of Food Science 54(4); 1989; 922-924, 939

Acid production was determined in cultures of Streptococcus thermophilus and Lactobacillus bulgaricus in the presence of penicillin and gentamycin in milks with water activity adjusted between 0.992 and 0.943 by adding glycerol, glucose or sucrose. Resistance of S. thermophilus ATCC 19258 and CRL 410 to penicillin increased when water activity was lowered with glycerol from 0.992 to 0.995 and from 0.992 to 0.985 in L. bulgaricus ATCC 11842. Susceptability to gentamycin increased in both sp. with reduction of water activity.

Susceptibility of S. thermophilus CRL 410 to penicillin increased i most cases when water activity was adjusted with glucose, while aci production at a water activity of 0.985 was always higher than tha of the controls (water activity 0.992) when sucrose was used. Wit L. bulgaricus CRL 420, lower acid production was observed at al penicillin concn., whether glucose or sucrose was used as the humec tant. AS

2448 Larsen (RF) and Anon (MC). Effect of water activity of milk on aci production by Streptococcus thermophilus and Lactobacillus bulgari cus. Journal of Food Science 54(4); 1989; 917-921

Rate of acid production by Lactobacillus bulgaricus ATCC 1184 and Streptococcus thermophilus ATCC 19258 was measured at temp between 30 and 50 C in milks which had been adjusted from 0.992 t 0.943 water activity with glycerol. Data were fitted with a nonli near mathematical model of the Arrhenius type. Decrease of wate activity inhibited acid production by both organisms. Range o temp., within which the rate of acid production was higher than 50 of the optimal rate, was also narrowed with both sp. Optimal temp of acid production were unaffected by changes of water activity Min. water activity for acid production was always lower when wate activity of milk was adjusted with glucose or sucrose than with gly cerol. AS

2449 Mahoney (RR) and Wilder (T). Stabilization of lactase (Escherichi coli) by milk components and related compounds. Journal of Food Sci ence 54(4); 1989; 899-901

Thermal stability of lactase was 170-fold greater in milk tha in phosphate buffer at 60 C. Enhanced stability was due primaril to casein, whose effect was largely substrate dependent. Casein o lactose alone had little or no effect, but together they stabilize the enzyme more than 400-fold at 60 C. The relative effectivenes of other proteins, as stabilizers, was: bovine serum albumin caseinate > ovalbumin > soy isolate > alpha-lactalbumin > lysozyme Galactose was much less effective than lactose in promoting stabil ity; sucrose and glucose were ineffective. Stability was dependen upon the concn. of lactose and casein, and decreased with increasin enzyme concn. Dithioerythritol increased stability in buffer but ha relatively little effect in milk. AS

2450 Nieto (MB) and Toledo (RT). A factorial approach to modelling wate activity of a multicomponent food in the high moisture range (wate activity 0.90-1.00). Journal of Food Science 54(4); 1989; 925-930

Water activity depression in a multicomponent food such as fi sausage was investigated using a 4 x 3 x 3 factorial design on combi nations of NaCl, non-fat dry milk (NFDM) and lard added to a fixe amount of minced fish. The effects of NaCl, NFDM, lard and th interaction NaCl x NFDM, were significant. The responses acro levels of the above factors were linear. From the magnitude o effect of each factor, two extended models for predicting wate activity were derived in terms of molal salt concn. and two empiric parameters called water activity depressing capacity, d and water binding capacity, WBC, resp. Both were demonstrated to predict accurately water activity of newly formulated fish sausage. AS

451 Noh (B), Richardson (T) and Creamer (CK). Radiolabelling study of the heat-induced interactions between alpha-lactalbumin, beta-lactoglobulin and K-casein in milk and in buffer solutions. Journal of Food Science 54(4); 1989; 889-893

Radiolabelled alpha-lactalbumin, beta-lactoglobulin and k-casein were added to milk prior to heating it at 95 C for up to 20 min. The distribution of these proteins between the micellar and serum phases and between various sized aggregates were determined chromatographically. The results from these and other supplementary exp. were consistent with a model of whey proteins denaturing in milk during heat treatment and using k-casein as a nucelation site for the formation of heat-induced complexes involving disulphide bonding. These heat-induced complexes, like k-casein itself, remained associated with the external surface of the casein micelle and continued to enlarge with additional heat treatment. AS

Milk products

452 Katiyar (SK), Kumar (N) and Bhatia (AK). Traditional milk products of Ladakh Tribes. Arogya 15(1); 1989; 49-52

Traditional milk products were recorded in the Ladakh area of Jammu and Kashmir State. In the process the milk is curdled, conc. in open pan over fire till thick paste is formed. The mass is sun-dried and preserved for further use as a dish. The products are consumed by local tribes as a rich source of protein and fat along with some micronutrients. AS

453 Sander (BD), Smith (DE), Addis (PB) and Park (SW). Effects of prolonged and adverse storage conditions on levels of cholesterol oxidation products in dairy products. Journal of Food Science 54(4); 1989; 874-879

The effects of normal and adverse environmental holding conditions on the formation of cholesterol oxidation products (COPS) in powdered cheeses and salted and unsalted butteroil were investigated. Little or no change in COPS levels was noted in a variety of powdered dairy products stored at 4, 21, or 38 C for up to 6 m. Storage for 18 m at 4 C resulted in a three-fold increase in the levels of COPS. Cheddar cheese powder continuously exposed to light (16111x) displayed increases in alpha-epoxide and 7-keto cholesterol through wk 3, thereafter declining to a level at wk 9 of about one-half of that seen at wk 3. Continuous heating of butteroil (110 C) caused large increase in COPS' levels, with unsalted butteroil exceeding levels found in salted butteroil by 2- to 3- fold. AS

Butter

2454 Otero (JA), Renedo (J) and Lena (G). Study of unsaponifiable of butterfat. Hydrocarbon fraction. Grasas Y Aceites 39(6); 1988; 359-362

The aim of this work is to study the aliphatic hydrocarbons present in the unsaponifiable matter of several samples of butterfat. Thin layer chromatography (TLC) was employed for preliminary fractionation of unsaponifiable after saponification and extraction, and hydrocarbons analyzed by gas chromatography (GLC). In the unsaponificable matter were found at least 20 linear hydrocarbons from C_9 to C_{28} phytene and squalene. The major hydrocarbons were C_{23} and squalene. AS

Cheese

2455 Arndt (EA) and Wehling (RL). Development of hydrolyzed and hydrolyzed isomerized syrups from cheese whey ultrafiltration permeate and their utilization in ice cream. Journal of Food Science 54(4); 1989; 880-884

Hydrolyzed lactose syrups (HLS) was produced from cheese whey ultrafiltration permeate by treatment with immobilized beta-galactosidase, deionization, and evaporation. The degree of hydrolysis was 97.2%. Hydrolyzed-isomerized lactose syrup (HILS) was produced from hydrolyzed, deionized isomerase, deionization and evaporation. The degree of isomerization was 34.8% HLS and HILS were substituted for 25% or 50% of the sucrose (on a solids basis) in vanilla ice cream. The mix freezing time increased when HLS or HILS was substituted for sucrose at a level of 50%. There were no significant differences in melting rates ($P < 0.05$) and few differences in sensory quality. AS

Cheddar cheese

2456 Puchades (R), Lemieux (L) and Simard (RE). Evolution of free amino acids during the ripening of Cheddar cheese containing added lactobacilli strains. Journal of Food Science 54(4); 1989; 885-888, 946

Cheddar cheese was produced with different lactobacilli strains added to accelerate ripening. The concn. of proteolytic products was determined as free amino acids in the water-soluble fraction at 2, 4, 7 and 9 months of aging and at two different maturation temp. (6, 15 C). All amino acids increased during ripening and were higher in the Lactobacillus-added cheeses than in the control cheese, and higher in cheeses ripened at 15 C than at 6 C. Glutamic acid, leucine, phenylalanine, valine and lysine were generally in higher proportion in all cheeses. The cheeses with added L. casei-casei L2A were classified as having at "strong Cheddar cheese" flavour after only seven months of ripening at 6 C. AS

Wheys

2457 Jackson (EH) and Jelen (P). Batch hydrolysis of lactose in concentrated whey systems. Journal of Food Science 54(4); 1989; 1086-1087

Commercial preparations of acid and neutral beta-galactosidases were assayed for their ability to hydrolyze lactose in wheys with varying total solids content. In wheys with 7.3 to 24.7% TS, and pH 4.5 and 55 C the lactose conversion obtained in 300 min with the acid lactase ranged from 92 to 75%. Similarly, the neutral lactase hydrolyzed between 92 and 79% of lactase in wheys adjusted to pH 6.5 and 35 C; however, the reaction appeared to reach its max. after 90 min in contrast to the acid lactase. AS

Whey proteins

2458 Asselin (J), Hebert (J) and Amiot (J). Effects of in vitro proteolysis on the allergenicity of major whey proteins. Journal of Food Science 54(4); 1989; 1037-1039

The effects of in vitro proteolysis on the allergenicity of major whey proteins (alpha-lactalbumin and beta-lactoglobulin) by simulating the human gastrointestinal conditions were evaluated. The proteolysis of demineralized whey with pepsin (pH 2.0 for 30 min) and/or various pancreatic enzymes (pH 7.5 for 60 and 240 min) was performed by the pH-stat technique at 37 C. The enzyme inactivation was performed by heating at 80 C for 20 min. Allergenicity of the hydrolyzates was evaluated by RAST inhibition using sera obtained from children allergic to whey proteins. Selective proteolysis of whey by pepsin and alpha-chymotrypsin was the most efficient combination of enzymes to reduce the allergenicity of both alpha-lactalbumin and beta-lactoglobulin. The above hydrolyzate could be used to develop an ingredient for infant milk formula with a lower allergenicity. AS

MEAT AND POULTRY

2459 Camou (JP), Sebranek (JG) and Olson (DG). Effect of heating rate and protein concentration on gel strength and water loss of muscle protein gels. Journal of Food Science 54(4); 1989; 850-854

The effect of heating rates (17, 38 and 85 C/h) and protein concn. (10, 20, 30, 40, and 50 mg/mL) on gels made of extracted salt-soluble proteins were evaluated. Gel strength decreased when heating rate was increased. A greater water loss from compressed gels occurred at protein concn. of 10 and 20 mg/ml than at 30 to 50 mg/mL. Protein loss in the expelled water, after compression, was less for the slower heating rates while the total amount of protein in the expelled water increased with increasing protein concn. in the system. SDS gel electrophoresis demonstrated a change in some of the expelled proteins at different heating rates. AS

Meat

2460 Caserio (G), Gronchi (C) and Villa (C). The Listeria presence in meat, fish, poultry, stuffed paste and vegetables. Industrie Alimentari 28(269); 1989; 250-253 (It).

2461 Houle (J-F), Lafrance (M), Julien (J-P) Brochu (E) and Champagne (CP). Selection of mixed cultures for meat fermentation. Journal of Food Science 54(4); 1989; 839-842

Strains of Pediococcus cerevisiae, Pediococcus acidilactici, Lactobacillus plantarum, Lactobacillus casei and Micrococcus varians were studied with the aim of preparing mixed cultures of compatible strains for meat fermentation. Addition of 0.18% nitrite was slightly inhibitory while addition of 7% of a spice mix proved stimulatory. Antibiosis was observed between lactobacilli and pediococci. Micrococcus varians did not produce inhibitory substances toward other cultures and was insensitive to bacteriocins produced by the lactobacilli or the pediococci. Antibioses observed using disk assays were confirmed in mixed acidification trials, and mixes of some fast-acidifying strains were unsuccessful. AS

2462 Rosinski (MJ), Barmore (CR), Dick (RL) and Acton (JC). Film sealant and vacuum effects on two measures of adhesion at the sealant-meat interface in a cook-in packaging system for processed meat. Journal of Food Science 54(4); 1989; 863-866

The adhesion of meat to five chemically different plastic sealant materials was determined for a vacuum-packaged, cook-in-the-film, processed meat product. Measures of adhesion strength at the sealant meat interface and quantity of film residue deposits resulting from adhesion were evaluated for product initially vacuum-packaged at 63.5, 69.8 or 75.9 cm Hg. Films with nylon, nylon-Surlyn blend or Surlyn sealants had higher adhesion strengths at each vacuum level compared to films with sealants of linear low density polyethylene or polypropylene. Adhesion strengths and quantities of residue generally decreased with increase in vacuum although individual sealant responses differed due to vacuum when adhesion was measured by meat residue deposits left on the film. AS

Beef

2463 Arganosa (GC), Godber (JS), Tanmchotikul (U), McMillin (KW) and Shoa (KP). Oxidative stability of restructured beef roasts as affected by cooking temperature. Journal of Food Science 54(4); 1989; 1972-1973

Restructured beef roasts (2.5 kg) were cooked in a water bath at 70, 85, and 100 C to an internal temp. of 65 C, then stored at 4 C for 0 and 3 days. Storage increased (P less than or equal to 0.05) oxidation; after 3 days storage, roasts cooked at higher temp. had higher (P less than or equal to 0.05) TBA values. Sensory panelists detected more (P less thah or equal to 0.05) warmed over flavour (WOF) due to storage; however, after 3 days there was less (P less than or equal to 0.05) WOF in samples cooked at 70 C than in samples cooked at 85 or 100 C. Interaction (P less than or equal to 0.05) between cooking temp. and storage indicated oxidation proceeded more rapidly with higher cooking temp. during refrigerated storage. Cook yield decreased as cooking temp. increased and expressible moisture was lower (P less or equal to 0.05) at 100 C than at 70 C. AS

2464 Faustman (C), Cassens (RG), Schaefer (DM), Buege (DR), Williams (SN) and Scheller (KK). Improvement of pigment and lipid stability in Holstein steer beef by dietary supplementation with vitamin E. Journal of Food Science 54(4); 1989; 858-862

2465 Marquez (EJ), Ahmed (EM), West (RL) and Johnson (DD). Emulsion stability and sensory quality of beef frankfurters produced at different fat or peanut oil levels. Journal of Food Science 54(4); 1989; 867-870, 873

2466 Shackelford (SD), Reagan (JO), Mann (TF), Lyon (CE) and Miller (MF). Effects of blade tenderization, vacuum massage time and salt level on chemical, and sensory characteristics of pre-cooked duck roasts. Journal of Food Science 54(4); 1989; 843-845, 905

Beef steaks

2467 Miller (AJ), Strange (ED) and Whiting (RC). Improved tenderness of restructured beef steaks by a microbial collagenese derived from vibrio B-30. Journal of Food Science 54(4); 1989; 855-857

Pork

2468 Nolan (NL), Bowers (JA) and Kropf (DH). Lipid oxidation and sensory analysis of cooked pork and turkey stored under modified atmospheres. Journal of Food Science 54(4); 1989; 846-849

Pre-cooked pork and turkey were stored at 4 C for 18 h and at -20 C for 3 months in vacuum and in atm. of air, carbon dioxide, and N. For both short-term refrigerated storage and long-term frozen storage, vacuum-packaging of precooked turkey and pork resulted in more meaty and less warmed-over flavour and aroma than the other packaging treatments. Samples stored in carbon dioxide and N atm. were less "oxidized" as indicated by sensory scores and TBA values than those stored in air but were more "oxidized" than vacuum-packaged meat. Warmed-over and rancid flavour and aroma scores correlated highly and consistently with TBA values, but inconsistently with the less sensitive fluorescence method. Vacuum-packaged turkey was darker and redder than other samples after frozen storage. AS

2469 Robson (CP), Collison (R) and Macfie (HJH). Factors affecting the shelf-life of precooked chilled roast pork. International Journal of Food Science and Technology 24(1); 1989; 59-67

Products

Meat

2470 Bersani (C) and Cantoni (C). Acetate sensitive lactobacilli in meat products. Industrie Alimentari 28(269); 1989; 254-258 (It).

Ham

2471 Kemp (JD), Langlois (BE), Akers (K) and Aaron (DK). Effect of storage temperature, time, and method of slicing on microbial population and white film development in vacuum packaged, dry-cured ham slices. Journal of Food Science 54(4); 1989; 871-873

Poultry

2472 Ashok Singh. Marketing poultry- a technique. Poultry Guide 26(8); 1989; 93-95

In the marketing of live poultry there are six classes of birds (broiler or fryer, roaster, capon, stag, hen or stewing chicken or fowl and cock) about which the author gives a short description. In marketing processed poultry the author describes the health regulations to be observed including ante-mortem inspection followed by different processing steps including receiving, killing, bleeding, scalding, defeathering, pinning, singeing, washing, evisceration, and cutting. The packing of the processed poultry and the inedible parts of poultry have also been briefly described. KAR

Chickens

Broilers

2473 Vandermarel (GM), De Vries (AW), Van Logtestijn (JG) and Mossel (DAA). Effect of lactic acid treatment during processing on the sensory quality and lactic acid content of fresh broiler chickens. International Journal of Food Science and Technology 24(1); 1989; 11-16

In this investigation lactic acid residues in treated poultry meat were studied. The lactic acid treatment during processing fresh broiler chickens was found to be effective for their microbial decontamination and preservation. The organoleptic quality of the product was not affected though the acid concn. increased only in the skin but not in the underlying muscle tissue. The appearance of the carcasses differed when compared to control samples. No difference was also noticed between the treated and untreated grilled legs. NGKR

Turkeys

2474 Wakefield (DK), Dransfield (E), Down (NF) and Taylor (AA). Influence of post-mortem treatments on turkey and chicken meat texture. International Journal of Food Science and Technology 24(1); 1989; 81-92

Poultry products

Eggs

2475 Lewis (BR) and Anita Bashin). Retailing policies for eggs. The implications of changes in consumer attitudes and behaviour. British Food Journal 90(1); 1988; 172-177

This article considers changes in the structure of retailing and in consumer eating habits with regard to fresh foods including eggs; investigates the role that fresh food plays in increasing store patronage and how it features in a company's competitive strategy; and detn. of the position of eggs in the market for fresh foods as perceived by major grocery retailers and to find out how their retailing policies towards fresh food and eggs are changing. BV

2476 Ramesh Babu (VS). Problems and prospects of marketing eggs-a case study. Poultry Guide 26(8); 1989; 89-92

This report of the egg marketing survey was conducted in Palamaner town of Chittoor Dist., Andhra Pradesh. The author after giving the types of egg producers and the main marketing functions indicates how the eggs are sold through the Poultry Farmers Welfare Association and indicates how this Association is better than other channels available for selling eggs in Palamaner town. KAR

2477 Sajdok (J), Pozarkova (D), Rauch (P) and Kas (J). Thermal denaturation of hen egg white studied by chromatographic and immunochemical technique. Journal of Food Science 54(4); 1989; 906-908

The course of thermal denaturation of hen egg white at 70 C was studied in detail by fast gel chromatography on Superose 12 and by immunochemical techniques. The mechanism of thermal denaturation differed depending on the pH of the environment. The aggregation of protein at the beginning of heat treatment was typical at pH 5 while at pH 9 the breakdown to smaller fragments prevailed. The chromatographic method for the determination of thermally undamaged (native) ovalbumin correlated well with the immunochemical method. AS

2478 Schaffner (DF), Handy (MK), Toledo (RT) and Tift (ML). Salmonella inactivation in liquid whole egg by thermoradiation. Journal of Food Science 54(4); 1989; 902-905

Salmonella enteritidis in liquid whole egg (LWE) was inactivated using heat, radiation and thermoradiation (combined heat and radiation). Rates of Salmonella inactivation was determined as a function of radiation dose, temp., initial cell number and pH. Thermoradiation caused a greater reduction in viable cell number than either heat or radiation alone. This effect was more pronounced at pH 6.5 than at pH 7.0, and more so at 60 C than at 50 C. The lower the initial cell number, the faster the rate of Salmonella inactivation. Physical denaturation of LWE was not apparent after thermoradiation below 60 C, and endogenous egg white lysozyme was not affected by thermoradiation (19.5 krad, 60 C) treatment. AS

SEAFOODS

2479 George (G). Export prospects of marine products in the small scale sector. Indian Food Industry 8(2); 1989; 12-13

The paper covers in detail regarding the profile of the seafood industry linked with the present status of the Indian seafood industry and the international trade in fishery commodities and future outlook. GP

2480 Walton (CG), Ratnayake (WMN) and Ackman (RG). Total sterols in seafoods. Latroscan TLC/FID versus the kovacs GLC/FID method. Journal of Food Science 54(4); 1989; 793-795, 804

The total sterols of selected seafood samples were determined after saponification, by latroscan TLC/FID and the results were compared with those obtained by the more common technique of GLC which gives individual sterols. No significant difference was found between the techniques in terms of quantitative accuracy for total sterols. In many products the sterol compositions were known or specific compositional details were not important. Thus, in most finfish and crustacea sp., cholesterol constituted over 90% of the sterols and, therefore, the Chromarodlatroscan TLC/FID with or without inclusion of an internal standard would give an accurate estimation of the cholesterol in fish products. AS

Dolphins

2481 Chen (HC) and Hu (CC). Microbiological studies of the cause of discolouration of common dolpin (Coryphaena hippurus) fillets. Journal of Food Science 54(4); 1989; 835-838

The effect of killing method of common dolphins aboard vessels on green pigment formation, and the microbiological survey of the green meat were studied. Eight bacterial strains which produced hydrogen sulphide in peptone Fe agar at both 4 and 25 C were isolated from green meat samples. The constituted one strain of Alteromonas putrefaciens and seven strains of Proteus vulgaris. Discolouration occurred when each of the eight isolates was reinoculated in normal fillets at 4 C. The bleeding operation has little effect on reducing green discolouration of the dolphin meat. Discolouration of the meat could be prevented by icing the fish and keeping them cold until they could be filleted and frozen. AS

Mussels

2482 Unnikrishna Nair (TS), George Joseph (K), Muraleedharan (V) and Kalaimani (N). Preparation of mussel marinade. Fishery Technology 26(2); 1989; 119-121

A simple and cheap process for the preservation of mussel meat by marinading is described. The method involves blanching the mussel meat shucked from depurated live mussels in 3% boiling sodium chloride solution for 5 min followed by preserving it in a solution of 3% acetic acid and 3% sodium chloride. The product stored in closed glass jars showed a storage life of about 16 wk at room temp. (23-30 C) after which the quality started deterioration. Texture of the meat is least affected and closely resembles that of the fresh meat. KAR

Fish

2483 Ammu (K), Stephen (J) and Devadasan (K). Influence of dietary proteins on cholesterol levels in albino rats. Fishery Technology 26(2); 1989; 125-130

Six groups of albino rats were fed identical diets but differing in their protein sources for 60 days. The protein sources used were fat free casein, defatted groundnut cake, and defatted fish powders from, three sp. of fishes, namely, the fresh water fish Labeo rohita, the marine fishes, Rastrelliger kanagurta and Otolithus argenteus and marine prawns, Parapenaeopsis stylifera. After 60 days, the cholesterol level in the serum, liver and heat of the rats were estimated. The casein group recorded the highest cholesterol level. Compared to casein, the groundnut protein was distinctly hypocholesterolemic. The fish proteins had a still greater cholesterol lowering ability. The proteins of prawns had the max. hypocholesterolemic effect. An attempt is made to correlate the cholesterol lowering effect of proteins with their respective amino acid comp. KAR

2484 Careche (M) and Jimenez Colmenero (F). Lipid oxidation in fish. Procedures of determination. Crasas Y Aceites 39(6); 1988; 387-396

Fish lipids contain highly unsaturated fatty acids. Depending on the type of fish and on the technological treatment are subjected to, lipids may undergo, to a higher or lesser degree, a series of alterations which lead to unpleasant sensorial characteristics which, reduce the acceptability of the product and, in some cases constitute an storage limiting factor. This type of deterioration, known as rancidity, depends on several factors and is due fundamentally to lipid oxidation. This study deals with the development of oxidative processes in fish lipids, taking into account the mechanisms they undergo and the intrinsic, extrinsic and technological factors which condition them. The paper includes also an analysis of the more interesting procedures for the measurement of lipid oxidation. AS

2485 Hidaka (A), Suzuki (H), Hayakawa (S), Okazaki (E) and Wada (S). Conversion of provitamin D_3 to vitamin D_3 by monochromatic ultraviolet rays in fish dark muscle mince. Journal of Food Science 54(4); 1989; 1070-1071, 1073

To determine whether the photochemical conversion of provitamin

D_3 is possible in fish meat, the dark muscle of skipjack was irradiated with monochromatic ultraviolet rays (peak, 305 nm; range, 280-360 nm) under various conditions of both time of exposure and strength of light. The vitamin D_3 and provitamin D_3 content were analyzed by HPLC. The vitamin D_3 content increased, and the provitamin D_3 content decreased with 20 W light at a distance of 50 cm. The conversion was at a max. 15 h after the start of irradiation and about 20% of the provitamin D_3 changed to vitamin D_3 AS

2486 Kekshmy Nair (A), Prabhu (PV) and Vasanth Shenoy (A). Fish sauce from two species of unexploited deep sea fish Peristedion adeni and Peristedion weberi. Fishery Technology 26(2); 1989; 122-124

P. adeni and P. weberi fish were fermented at ambient temp. (30 plus or minus 2 C) for 12 months in 4:1 ratio of salt. During fermentation total solids content, total N and alpha-amino N increased. The sauce yield ranged from 16.4 to 18% and it possessed a brownish yellow colour and conformed to the special grade prescribed by the Food and Drug Administration of USA. The sauce had an acceptability score of 3 (on a 1 to 5 Hedonic scale) and the solubility of protein after 9 months maturation was no appreciable. KAR

2487 Ragharsson (K) and Regenstein (JM). Changes in electrophoretic patterns of gadoid and non-gadoid fish muscle during frozen storage. Journal of Food Science 54(4); 1989; 819-823

Sodium dodecyl sulphate polyacrylamide gel electrophoresis of fish muscle during frozen storage showed that a crosslinked protein of 280,000 daltons formed with gadoids, whereas this band did not occur with non-gadoid fish sp. For cod, 20 days at -7 C are needed for the crosslink to appear, whereas for whiting only 3 days are needed. Formaldehyde (FA) may be responsible for the crosslinking. Adding ascorbic acid to cod mince prior to freezing accelerated dimethylamine and FA formation during frozen storage and accelerated the formation of the crosslinked protein, while leaving cod fillets on ice for 10 days prior to freezing, reduced the Instron hardness and the crosslinked protein did not appear with 50 days of frozen storage at -7 C. AS

2488 Sano (T), Noguchi (SF), Matsumoto (JJ) and Tsuchiya (T). Role of F-actin in thermal gelation of fish actomyosin. Journal of Food Science 54(4); 1989; 800-804

The thermal gelation processes of the myosin-natural actomyosin system were investigated to determine the role of F-actin in thermal gelation of actomyosin. The dynamic viscoelastic behaviour during thermal gelation changed considerably depending on the (F-actin)/(myosin) ratio. F-actin gave the viscosity to an actomyosin sol but did not affect the elasticity development occurring in the 30-46 C range. The decrease in storage modulus in the 46-53 C range was directly induced by the presence of F-actin. The gel of myosin alone showed the highest elasticity, while that of myosin containing a small amount of F-actin had the highest elastic modulus. AS

2489 Subrata Basu, Imam Khasim (D), Gupta (SS) and Panduranga Rao (CC). Quality of dry fish from markets in Andhra Pradesh. Fishery Technology 26(2); 1989; 114-118

Dry commercial fish (124 samples) comprising 15 var. were collected from markets in Andhra Pradesh and analysed for moisture, total volatile N (TVN), salt content, total ash, acid insoluble ash, total plate count and organoleptic score. Fish were separately lab. dried and tunnel dried. Only 30% of the fish showed a moisture content within the prescribed Indian Standards Institution (ISI) specification and 15% of the fish contained salt within the ISI prescribed limit. The acid insoluble ash content was above the ISI limits in all samples. The salt and acid insoluble ash of tunnel dried fish were below the ISI limits but the lab. dried sample showed marginally higher acid insoluble ash. The poor quality of the market samples of fish was reflected in the high TVN values (105.8-426.7 mg/100 g) and heavy sand contamination. About 80% of the market samples showed 20-80 coliform per gram which was absent in lab. and tunnel dried samples. None of the samples showed the presence of bacteria. of public health significance. KAR

2490 Thiagarajan (R) and Kandoran (MK). Relative retentivity of knowledge in fish processing by fisherwomen. Fishery Technology 26(2); 1989; 144-148

Retention of knowledge in the preparation of fish pickle, fish wafers and fish soup powder for an experimental group of 20 fisherwoman selected from 3 fishing villages was studied. The knowledge retention immediately after exposure was 100% but the knowledge reduction was 13.75% on 15th day and 50% on 30th day. Highly educated women retained more knowledge than the low educated women; young women retained more knowledge than old women. The income showed negative and significant relationship with knowledge reduction. KAR

2491 Thiagarajan (R), Mohan (B) and Kandoran (MK). A scale to measure the attitude towards improved fish processing methods. Fishery Technology 26(2); 1989; 140-143

An attitude scale was constructed to measure the attitude of fisherwomen towards improved fish processing methods. To construct the attitude scale, "scale" and `Q' values (the interquartile ranges) were calculated for 31 statements selected, based on the opinion of 34 judges. Based on the `scale' and `Q' values 16 statements were selected with eight favourable statements and 1, 2 and 3 for unfavourable statements. The reliability of the scale was tested by test-retest method and it gave a correlation of 0.81 which indicated that attitude was highly stable for measurement. KAR

Cod

2492 Ang (JF) and Hultin (HO). Denaturation of cod myosin during freezing after modification with formaldehyde. Journal of Food Science 54(4); 1989; 814-818

Formaldehyde at concn. occurring in frozen fish increased the extent of denaturation as measured by loss in solubility, decrease in ATPase activity and increase in surface hydrophobicity, of partially purified cod myosin stored at -25 C or -80 C. Most denaturation occurred during the freezing/thawing process. Formaldehyde caused some crosslinking of myosin, but crosslinking and insolubilization appeared to be relatively independent. The presence of diamines led to some increase in crosslinking but had little effect on protein solubility. AS

2493 Hastings (RJ). Comparison of the properties of gels derived from cod surimi and from unwashed and once-washed cod mince. International Journal of Food Science and Technology 24(1); 1989; 93-102

Surimi is washed and stabilized fish mince with valuable gel-forming properties. However the preparation process is wasteful and a modified process, with less washing, was investigated. The properties of the gels (cooked at 40- C for 30 min followed by 90 C for 40 min) were assessed by instrumental and sensory methods. Gels prepared from surimi were soft and very flexible; gels from unwashed fresh cod mince were firmer and less elastic, but still gave a max. score on the folding test. A single wash made the gels firmer and slightly more elastic that those from unwashed mince. Gels from unwashed mince of frozen cod were firmer than surimi derived gels, and were the most brittle. Sensory assessment of the gels found no difference in firmness between the different washing procedures and small differences in elasticity and toughness. The addition of starch (fish:starch, 100:5, w/w) increased the firmness and sensory toughness of each derived gel, and reduced the elasticity in the mouth of non-surimi gels. The colour of gels derived directly from fish was off-white, compared with the white surimi-derived gels. The colour of the former darkened during frozen storage, but lightened again after thawing. AS

2494 Hsieh (YL) and Regenstein (JM). Texture changes of frozen stored cod and Ocean perch minces. Journal of Food Science 54(4); 1989; 824-826, 834

During frozen storage, minced cod and Ocean perch were examined by expressible moisture (EM), water binding potential (WBP) and computerized texture profile analysis (TPA). The results suggested that a microcomputer interfaced with the Instron efficiently performed TPA. The texture and water loss fish minces changed more rapidly at -7 C storage than at -20 C and -40 C. Furthermore, cod, a gadoid with the ability to degrade trimethylamine oxide to dimethylamine and formaldehyde, deteriorated faster than Ocean perch, which did not have this ability. EM was useful for examining the water loss of frozen fish at -7 C only during the first two wks of storage. The WBP at -7 C storage showed a good correlation with storage time for cod and Ocean perch. This suggests that WBP might be a good indicator for examining water holding ability of fish proteins. AS

2495 LeBlanc (EL) and Leblanc (RJ). Separation of cod (Gadus morhua) fillet proteins by electrophoresis and HPLC after various frozen storage treatments. Journal of Food Science 54(4); 1989; 827-834

Myofibrillar, sarcoplasmic (SAR) and total extractable proteins (TEP) were isolated from the same lot of frozen cod (Gadus morhua) fillets stored at -30 C, -22 C, and -12 C and a stimulated industrial fluctuating temp. (SIFT) program. HPLC and SDS-PAGE showed that myofibrillar and SAR of the fillets stored at -12 C and -15 C exhibited low and high mol. wt. changes similar to the SIFT. A new indicator of myofibrillar frozen storage quality was developed using SDS-PAGE. TEP profiles by HPLC were time and temp. dependent. These observation by SDS-PAGE and HPLC were further evidence that changes in frozen stored cod muscle were partially due to covalent S-S croslinking. AS

Kalawa

2496 Joseph (AC), Surendran (PK) and Pearigreen (PA). Delayed freezing on the quality and shelf-life of kalawa (Epinephelus spp.). Fishery Technology 26(2); 1989; 107-110

Kalawa (Epinephelus spp.) caught on board was frozen (i) in fresh as well as after keeping (ii) for 5 and (iii) 10 h at ambient temp. (about 30 C) and cold stored at -20 C. The changes in moisture, non-protein N (NPN), salt soluble N (SSN), total volatile basic N (TVBN) and organoleptic score were determined during 62 wk. of storage. Moisture decreased slightly in all treatments during storage. NPN values of (ii) and (iii) were higher than (i) at the beginning and they did not indicate a definite pattern of change during storage. SSN values indicated a reduction of 45-50% after 62 wk of storage. TVBN value was min. in (i) and max. in (iii) throughout the storage. Organoleptic score was also max. in (i) and min. in (iii). It was concluded that (i) and (ii) were acceptable even after 62 wk of storage and (iii) was acceptable only for 48 wk. Escherichia coli and coagulase positive staphylococci were absent in all the treatments throughout the storage period; total bacterial count was least in (i) and highest in (iii). KAR

Psenopsis cyanea

2497 Balachandran (KK) and Vijayan (PK). Studies on canning Psenopsis cyanea. Fishery Technology 26(2); 1989; 111-113

Suitability of Psenopsis cyanea, a deep sea fish caught from a depth of 350 m off Cochin was canned by natural pack, brine pack and oil pack and stored for 9 months. Initial experiments showed that the skin detached and got admixed with the can contents giving a bad appearance. Gentle agitation of fish in 0.25% aqueous solution of lactic acid at ambient temp. for 15 min followed by through washing yields skinless fish. The fish which has 52% fat lost about 8% fat during deskinning. Fish canned in natural style and in brine showed better organoleptic characteristics initially. On storage they developed slight rancidity. Fish canned in oil maintained good characteristics even after 12 months. NGKR.

Trouts

2498 Autio (K), Kiesvaara (M) and Polvinen (K). Heat induced gelation of minced rainbow trout (Salmo gairdnerii). Effect of pH, sodium chloride and setting. Journal of Food Science 54(4); 1989; 805-808, 823

The structure formation of minced rainbow trout was monitored during heating from 30 C to 85 C by a dynamic rheological method. The maxima of storage modulus (G') were found at 37 C and in the range of 45 to 60 C. The largest differences in rigidity resulted from seasonal variations. Firmest protein matrix was obtained by using well-fed fish as raw materials, by setting the gels at 35 C and using a pH value around 6.1. Sodium chloride in the range 1-2% had little effect on the final rigidity of the minced rainbow trout gels. AS

2499 Azam (K), Mackie (IM) and Smith (J). The effect of slaughter method on the quality of rainbow trout (Salmo gairdnerii) during storage on ice. International Journal of Food Science and Technology 24(1); 1989; 69-79

Ranibow trout (Salmo gairdnerii) were stunned by electrocution, exposure to elevated concn. of carbon dioxide and by a blow to the head, and subsequently bled. The fish were stored ungutted in ice for up to 15 days, and the changes in the textural properties of the flesh of the fish were measured by a sensory panel and with a texturometer. Parallel changes in the concn. of spoilage-related biochemical constituents, in water-holding capacity and in bacterial counts were also determined. Slaughter by electrocution and by carbon dioxide narcotization led to a greater initial production of lactic acid and a slightly reduced pH, compared with slaughter by a blow to the head. No significant differences were found in the values of the other indices of quality, either immediately after death or during post-mortem storage. AS

2500 Han (TJ) and Liston (J). Lipid peroxidation protection factors in rainbow trout (Salmo gairdnerii) muscle cytosol. Journal of Food Science 54(4); 1989; 809-813

Two types of lipid peroxidation protection factors were found in rainbow trout white muscle cytosol. One type of protection factor is heatlaible and nondialyzable. This type of protection factor could be superoxide dismutase, catalase, or a yet uncharacterized proteinaceous factor. The other type is heat-resistant but dialyzable. Iron chelating reagent, such as inorganic phosphate could belong to this type of protection factor. Both types are glutathione (GSH)-independent and preserve polyunsaturated fatty acid in fish muscle microsomes. This indicates that these protection factor are able to prevent the initiation of lipid peroxidation of polyunsaturated lipids. AS

Products

Fish

2501 Gopalakrishna Iyer (TS) and Shrivastava (KP). Reliability of Escherichia coli and faecal Streptococci as indicators of Salmonella in frozen fishery products. Fishery Technology 26(2); 1989; 137-139

24 frozen fishery products collected from processing factories at Cochin (India) were enumerated for total bacteria, E. coli and faecal streptococci. Of the 24 Salmonella-positive samples, 7) mostly shrimp and fish) did not contain E. coli or faecal streptococci and 10 contained faecal streptococci in low numbers (< 250/g in 80% of the cases) but no E. coli and only 7 Salmonella positive samples showed the presence of faecal streptococci and E. coli. KAR

2502 Gopalakrishna Iyer (TS) and Shrivastava (KP). On the pattern of Salmonella serotypes in fishery products, froglegs and processing environments. Fishery Technology 26(2); 1989; 131-136

Frozen samples of 480 shrimps, 13 lobster, 50 cuttle fish, 30 squids, 1 red snapper, 8 cat fish, 40 seer fish, 120 froglegs, 150 dried jawala prawns, 25 utensils, 150 floor, 50 workers palm, 50 water, 120 ice, 120 raw shrimp, 10 raw fish, 2 raw lobsters and 10 raw froglegs were analysed for Salmonella serotypes. 34 serotypes of Salmonella have been isolated of which 22 were from froglegs, and 4 from frozen shrimps. S. weltevreden predominates in frozen shrimps and fish. S. roan and S. larochelle were isolated for the first time in India. Isolation of six rare serotypes of Salmonella has been reported. KAR

2503 Ramachandran (A). Processing and marketing of semi-dried fish products from Veraval. Seafood Export Journal 21(7); 1989; 15, 17, 19-23, 25-26

In Veraval (Gujarat) semi-dried fish from elasmobranchs, ribbon fish (Trichiurus spp.), Dhoma (Otolithus spp.), Lactarius and Cat fish (Arius sp.) are produced and marketed in Kerala and Tamil Nadu (India). Consumers prefer the semi-dried fish over the dry fish due to its attractive colour, appearance and flavour. This article gives processing details including washing, pre-processing, salting, surface drying, stacking in alternate layers of salt, surface salt removal, surface drying and packing. Information on the chemical comp. of fresh fish and semi-dried fish prepared from different fishes, yield of semi-dried products and loss during transportation, purchase price of fresh and selling price of semi-dried fish and the marketing channels have also been described. KAR

PROTEIN FOODS

Nil

ALCOHOLIC AND NON-ALCOHOLIC BEVERAGES

2504 Vyas (KK), Sharma (PC), Joshi (VK) and Srivastva (MP). Standardization of a method for juice extraction and preparation of refreshing RTS nectar from Rhodo petals (Rhododendron arboreaum). Indian Food Packer 43(4); 1989; 8-12

Juice was extracted from Rhododendron petals after four different treatments (1) petals dried, washed and crushed, (ii) petals washed in hot water dried and crushed (iii) petals dipped in hot water and crushed and (iv) petals washed, boiled in water at 2:1 ratio) and the extracted juice were analysed for chemical constituents. The method (iv) was found best for juice extraction. RTS beverage was prepared with different combinations of juice content, TSS, acidity, colour and flavour. A combination having 20% juice content, 15 Brix TSS, 0.35% acidity and flavour of strawberry and raspberry, mixed in 1:1 at 400 p.p.m. level and carmosine colour at 20 p.p.m. was found to be the most favoured blend. The shelf life of the product was 6 months when stored in 200 ml bottles after pasteurization. The cost of production per bottle was Rs. 1.66. VKR

Alcoholic beverages

Wines

2505 Delfini (C). Refermentation potential in bottled sweet wines of yeasts adopted to sulphur dioxide. Chemie Mikrobiologie Technologie der Lebensmittel 11(5); 1988; 137-142

An investigation was conducted to determine the ability of sulphur dioxide acclimated strains of Saccharomyces cerevisiae, Zygosaccharomyces bailii, Saccharomycodes ludwigii and Schizosaccharomyces japonicus to referment sweet, sparkling wine (Asti Spumante). The yeast strains were acclimated to levels from 9.2 to 11.5 mg/L sulphurous acid (molecular sulphur dioxide) in a synthetic medium. Samples of two Asti spumante wines having different sulphur dioxide binding capacities, were added with increasing concn. of sulphur dioxide and inoculated with the sulphur dioxide acclimated yeasts. Production of carbon dioxide and/or cell mass was detected. High sulphur dioxide binding capacities of the wines and high frequencies of sulphur dioxide resistant mutants of yeast populations allow the production of carbon dioxide and/or cell mass even in the presence of initial massive doses of sulphurous acid. Single cells produoed separate and well visible colonies on the bottle bottom. Thus, the max. range of wine microbiological stabilization by filtration and sulphur dioxide treatment is not correlated to the lowest number of residual cells when an improper and generalized use of sulphur dioxide selects resistant mutants. AS

2506 Lazos (ES) and Alexkis (A). Metal ion content of some Greek wines. International Journal of Food Science and Technology 24(1); 1989; 39-46

The amounts of metal ions found in Greek wines were determined and reported in this paper. The ions of K (1440 mg l^{-1}), Na (277 Mg l^{-1}) and Ca (31.9 mg l^{-1}) were found to be greatest and among others mean Fe and Al concn. were 3.51 and 2.35 Mg l^{-1} resp. Cu, Zn and Pb were 0.20 and 0.41 mg l^{-1}; Li, Ni, Cr, Co and Cd were < 0.01 mg l^{-1}. These data are compared with literature data for wines of different origins. NGKR

2507 Litchev (V). Influence of oxidation processes on the development of the taste and flavour of wine distillates. American Journal of Enology and Viticulture 40(1); 1989; 31-35

The role of oxidation in development of the taste and flavour of wine distillates during barrel aging is revealed. A non-enzymatic oxidation of the extracted oak wood lignin and its conversion into aromatic aldehydes via radicals is proposed. An increase in the concn. of the components forming the flavour of wine distillates during maturation is reported. AS

2508 McClellan (CJ), Does (AL) and Bisson (LF). Characterization of hexose uptake in wine strains of Saccharomyces cerevisiae and Saccharomyces bayanus. American Journal of Enology and Viticulture 40(1); 1989; 9-15

The kinetics of glucose uptake was examined in three wine strain of Saccharomyces UCD 522 (Montrachet), UCD 505 (California champagne), and Cantarelli chanpagne. The regulation and level of uptake activity was found to be similar to that observed for lab. strains. Investigation of UCD 530 (Tokay), characterized as a poor fermenter, revealed that this strain lacked a major glucose transport system, the low affinity system. Glucose uptake in UCD 522 was further analysed during fermentation of French Colombard must. The concn. of glucose more so than the phase of growth was the main regulatory factor modulating glucose uptake activity. Cells grown in must displayed significant substrate inhibition of glucose uptake not observed in lab. media, and overall level of uptake was greatly reduced in these cells. Thus, the uptake of sugars is dramatically decreased during vinification limiting both the speed and completeness of the fermentation, as compared to lab. media. AS

2509 Monteiro (FF), Trousdale (EK) and Bisson (LF). Ethyl carbamate formation in wine. Use of radioactively labeled precursors to demonstrate the involvement of urea. American Journal of Enology and Viticulture 40(1)1-8;

The formation of ethyl carbamate was investigaed in model solutions and in wines using radioactively labeled urea and monitoring the appearance of that radioactivity in ethyl carbamate. There was a striking temp. dependence for the rate of the reaction as well as a dependence upon urea and ethanol concn. the source of urea during fermentation was investigated using radioactivity labeled arginine (guanido ^{14}C) . Under the conditions used here, arginine was degraded to urea, and some urea was released into the fermentation medium. More urea could be released from the cells when ethanol concn. was elevated, as a consequence of fortification of the must. There was significant turnover and degradation of arginine in cells incubated in the presence of ethanol, as would occur during commercial fortification of musts. Thus, urea can be formed during vinification and, if released into the medium, will yield ethyl carbamate through reaction with ethanol. AS

2510 Nitz (S), Kollmannsberger (H) and Drawert (F). Determination of non-natural flavours in sparkling fruit wines. 1. Rapid method for the resolution of enantiomeric gamma-lactones by multidimensional GC. Chemie Mikrobiologie Technologie der Lebensmittel 12(3); 1989; 75-80

Chiral gamma-lactones of some commercially available sparkling fruit wines were directly resolved by multidimensional gas chromatography (MDGC). This was achieved by separation on a wide bore CW20M precolumn, heart-cutting into an intermediate trap and on-line transfer into a chiral main separation column (Lipodex B). A directly coupled mass spectrometer was used for definite structure assignment of the resolved enatiomers. AS

2511 Sciancalepore (V). Extraction of protein from wine lees. American Journal of Enology and Viticulture 40(1); 1989; 65-66

The extraction procedure and the effects of sodium hydroxide concn. time temp. of extraction on protein extractability from wine lees were evaluated. An optimum was found for disintegrated wine lees after extraction for 30 min at 50 C with 0.8% sodium hydroxide at pH 12.5. The kjedahl protein obtained by acid precipitation (pH 3.5) of the alkaline extract represented 45% of total wine-lees protein. AS

Non-alcoholic beverages

Fruit juices

2512 Bhumbla (VK), Singh (AK) and Singh (Y). Prediction of thermal conductivity of fruit juices by a thermal resistance model. Journal of Food Science 54(4); 1989; 1007-1012

A model for prediction of thermal conductivity of fruit juices was developed. The model was based on the concept of thermal resistances in parallel and compared with other models and experimental values. Effect of temp. and solid concn. on thermal conductivity was discussed. Extension of the model to predict thermal conductivity of fruit juices below the freezing temp. was briefly discussed. The model gave error of less than 10% from the experimental values for juices for which such values were available. AS

Apple juices

2513 Bayindirli (L), Ozilgen (M) and Ungan (S). Modeling of apple juice filtrations. Journal of Food Science 54(4); 1989; 1003-1006

In cake filtration of apple juice, usage of filter aid increased filtration rates. Precoating the filter medium with diatomaceous earth increased filter medium resistance, but cloudy juice was produced in its absence. There was an inverse relation between filtration rates and resistance. Although these were expected results, they did not agree with most of the present filtration theories. De La Garza and Boulton's "exponential model" of wine filtrations simulated the data satisfactorily. Our results show that the common filtration theories, adapted from the other disciplines, may not be appropriate for food engineering analysis. AS

2514 Sapers (GM), El-Atawy (YS), Hicks (KB) and Garzarella (L) Effect of emulsifying agents on inhibition of enzymatic browning in apple juice by ascorbyl palmitate, laurate and decanoate. Journal of Food Science 54(4); 1989; 1096-1097

The effects of emulsifying agents (EA) on the stability of aqueous dispersions of ascorbyl palmitate (AP), laurate (AL), and decanoate (AD), and on the effectiveness of these compounds as browning inhibitors in apple juice were investigated. The stability of 1.14 mM AP, AL or AD, dispersed in simulated juice, was greatly improved by the addition of hydrophilic EA's such as Tween 60. More lipophilic EA's also were effective in stabilizing AL and AD dispersions. However, the addition of EA's to these browning inhibitors failed to improve their effectiveness in juice and, in the case of Tweens, had a detrimental effect. These results are attributed to the solubilization or activation of bound polyphenol oxidase. AS

Lime juices

2515 Khurdiya (DS). Factors affecting the quality of lime juice based carbonated drink. Indian Food Packer 43(4); 1989; 17-20

The effect of carbon dioxide gas pressure and water and lime peel oil on the quality of the lime juice based carbonated drink was assessed. The lime juice was prepared with (10 C Brix) and (i) with 0.2, 0.25, 0.3%, acidity and carbonated under 50, 75 and 100 psi carbon dioxide gas pressure; and (ii) mixed with sugar in 1:3 ratio, carbonated to give 0.2% acidity with added lime peel oil. The drink containing 3% juice with 0.2% acidity, 10 C Brix, carbonated under 100 psi of carbon dioxide was adjusted best. VKR

Soft drinks

2516 Akinpelu (OA) and Ogunmoyela (O). Quality aspects of locally manufactured soft drinks. An assessment. Food Science & Technology Today 2(2); 1988; 104-109

The paper assesses the inputs into this industry and the quality of the finished products from the factory through shelf-life. The activities of pirate manufacturers and established consumer attitudes are also discussed. BV

FATS AND OILS

Fats

2517 Morehouse (SE) and Zabik (ME). Evaluation of polydimethylsiloxane fluids as non-caloric frying media. Journal of Food Science 54(4); 1989; 1061-1065

Synthetic polydimethylsiloxane (PDMS) fluids were evaluated for their potential use as noncaloric deep fat frying media, even though use of PDMS fluids as a food ingredient has not received FDA approval. Fish patties, French fries and cake doughnut holes were each fried separately in 35, 100, 350, and 1000 centistoke (cst) PDMS fluids and in corn oil (control). Time/temp. relationship and product quality attributes were objectively measured. Of the PDMS fluids examined, the 35 cst functioned most effectively as a synthetic frying medium due to efficient heat transfer and accepatable quality of food fried in it. Fat content of each PSMS-fried food was one-quarter or less of the fat content of the corn oil-fried controls. AS

Oils

2518 Aitzetmuller (K). Chlorophyll degradation products in vegetables oils. FAT Science and Technology 91(3); 1989; 99-105 (De).

The colour of crude vegetables oils depends, apart from carotenoids and other substance, on the presence of chlorophylls or their degradation and isomerisation products. These coloured products can be more or less effectively removed during subsequent steps of refining. These substances exhibit natural fluorescence, and the presence of different structural elements or functional groups permits their separation in reversed-phase chromatography. Using HPLC with fluorescence detection, a more detailed investigation of such products in vegetable oils is possible. AS

2519 Arkcoll (D). Lauric oil resources. Economic Botany 42(2); 1988; 195-205

Cottonseed oils

2520 Clay King (C) and Oliiko (J). The use of cottonseed oil in vegetable shortenings. Cereal Foods World 34(3); 1989; 273-235

This article discusses the conformations of cottonseed oil, shortening functions and characteristics applications, and nutritional aspects of cottonseed oil. PHR

Soybean oils

2521 Mounts (TL). Processing of soybean oil for food uses. Cereal Foods World 34(3); 1989; 268-272

This feature article discusses about soybean oil processing which includes degumming, refining, bleaching, deodorization and hydrogenation. Steps in the manufacture of baking shortening and margarine based on soybean oil were also discussed. PHR

Sunflower oils

2522 Nasirullah and Nagaraja (KV). Oxidative rancidity in refined sunflower oil with respect to storage variation. FAT Science and Technology 91(2); 1989; 80-82

Refined sunflower oil was stored in brown and colourless glass bottles at ambient temp. (18-32 C) and 37 C to assess the effect of light, heat and air on the tability of the oil and to record the progress of oxidative rancidity especially the secondary stages with respect to storage variation and time. Oil sample stored in brown colour bottle was found to be superior (FFA 0.15 to 0.53; PV 0.5 to 80; HV 3 to 12; oxirane oxygen 0.2 to 2.3) over oil stored in colourless bottle (FFA 0.15 to 0.60; PV 0.5 to 91; HV 3 to 8; oxirane oxygen 0.1 to 2.8) at ambient temp. Samples stored at 37 C deteriorated very fast. Silver nitrate test, oxidised fatty acid formation, urea adduct formation, picric acid- TLC test, Kreis test, DNP-TLC test, DNP-precipitation test have been devised to detect and follow oxidative rancidity. These tests worked well even at the lower levels of oxycompounds. No conjugation was detected in any of the oil. AS

SPICES AND CONDIMENTS

Garlic

2523 Yu (T-H) and Wu (C-M). Stability of allicin in garlic juice. Journal of Food Science 54(4); 1989; 977-981

Stability of allicin in garlic juice was evaluated by gas chromatography (GC) and non-heating HPLC. Allicin in garlic juice decreased to a non-detectable amount after 144 h at 40 C. Because of heating effects, allicin, in GC analysis, was converted to 2-vinyl-[4H]-1,3-dithiin and 3-vinyl-[4H]-1,2-dithiin but not 3-vinyl-1,2-dithi-4-ene as reported by other investigators. Unheated garlic juice did not contain detectable amounts of 2-vinyl-[4H]-1,3-dithiin and 3-vinyl-[4H]-1,2-dithiin as shown by HPLC analysis. AS

SENSORY EVALUATION

2524 Mela (DJ). A comparison of single and concurrent evaluations of sensory and Hedonic attributes. Journal of Food Science 54(4); 1989; 1098-1100

Allowing judges to make simultaneous evaluations of multiple sensory attributes on individual test stimuli may make the most economical use of resources, however, this method assumes that the express rating of one property does not produce artifactual changes in the concurrent ratings of others. In the present study, subjects evaluated a set of crackers with spread having a wide range of salt levels, and rated saltiness and/or oiliness and/or pleasantness alone and in various combinations. The evaluation conditions produced neglible differences in ratings, suggesting that such concurrent rating procedures may be a valid, as well as efficient, method of collection of this type of sensory data. AS

2525 Rajalakshmi (D) and Shanthi Narasimhan). Sensory analysis. The science of quality assessment. Indian Food Industry 8(2); 1989; 14-16

The paper deals with the systematic and scientific approach to the sensory qualities of the food products and their importance from the point of view of the consumer's market. The concept of sensory evaluation is dealt in detail in terms of sight, smell, taste, touch and hearing, linked with the overall acceptability of the food products. GP

FOOD STORAGE

2526 Doharey (RB). Biochemical changes caused by storage fungi in stored grains. Bulletin of Grain Technology 27(1); 1989; 45-51

This review describes biochemical changes caused by storage fungi in stored grains as about 2% of the total world production of grain is damaged by microflora. It covers storage fungi such as Aspergillus and Penicillium; biochemical changes such as changes in fat, protein, carbohydrates, minerals and vitamins. 29 references. NGKR

2527 Shiv Shanker, Ashok Kumar, Srivastava (JL) and Sone Lal. Storage losses/gain in food grains due to variation in moisture content in commercial warehouses. Bulletin of Grain Technology 27(1); 1989; 3-7

In this study the storage loss/gain in wheat, rice and paddy during six months and one yr storage under N. Indian climatic conditions was estimated and results presented. These were carried out in three Food Corpration of India Depots located at Hapur, Partapur and Muzaffar Nagar in Uttar Pradesh in India. Results showed 2.20% gain in wheat due to variation in moisture content during 6 months storage and 0.63% in 1 yr storage whereas the corresponding gain in wt. of wheat grain calculated on cent per cent weighment basis were 1.67 and 1.31 resp. However, in case of raw rice there were 3.04 and 3.86% losses during 6 months and 12 months storage due to variations in moisture whereas the actual driage losses calculated on 100% weighment basis were 2.64 and 3.35% resp. In paddy grains also driage losses during 6 months 12 months storage were 3.25 and 4.75% whereas the corresponding actual losses in their wt. on 100 % weighment basis were 3.37 and 5.73% resp. NGKR

INFESTATION CONTROL AND PESTICIDES

Pesticides

2528 Veera Babu (GR), Ramesh Reddy (G) and Chetty (CS). Benthiocarb poisoning in rat. Kinetic study of liver magnesium-ATPase. Arogya 15(1); 1989; 1-4

In vitro effects of benthiocarb on Mg^{2+}-ATPase were studied in liver of albino rat to elucidate the interaction of benthiocarb with ATPase system. The significant decrease in max. velocity (Vmax) without appreciable change in apparent Michaelis-Menten constant (Km) suggests that the effect of benthiocarb on Mg^{2+} -ATPase is independent of substrate and is of a classical non-competitive type. AS

BIOCHEMISTRY AND NUTRITION

Biochemistry

2529 Lawry (KR) and Baker (DH). Effect of storage, carbohydrate composition, and heat processing on protein quality and amino acid availability of a commercial enteral product. Journal of Food Science 54(4); 1989; 1024-1030

Rat bioassays revealed that protein quality of a commercial enteral product was not affected by carbohydrate (CHO) content, heat treatment or storage. Slope-ratio regression analysis of wt. gain yielded lysine (LYS) and sulphur amino acid (SAA) bioavailability estimates of 96.7% and 100.0% (relative to crystalline sources of LYS and SAA), resp., regardless of CHO content or heat treatment. With storage of the products containing CHO with dextrose equivalency values greater than or equal to 17.3 LYS bioavailability in the products with lower reducing sugar content was not affected by storage. SAA bioavailability was not affected by storage, regardless of CHO content. AS

2530 Mauri (LM), Alzamora (SM), Chirife (J) and Tomio (MJ). Kinetic parameters for thiamine degradation in foods and model solutions of high water activity. International Journal of Food Science and Technology 24(1); 1989; 1-9

This review covers kinetic model for thiamine degradation in foods, temp., water activity, system composition, pH, oxygen and catalysts. NGKR

2531 Sen (AC), Owusu-yaw (J), Wheeler (WB) and Wei (CI). Reactions of aqueous chlorine and chlorine dioxide with tryptophan, N-methyltryptophan, and 3-indolelactic acid. kinetic and mutagenicity studies. Journal of Food Science 54(4); 1989; 1057-1060

Reactions of tryptophan, N-methyltryptophan and 3-indolelactic acid with aqueous chlorine or chlorine dioxide in 0.1 M potassium phosphate buffer, pH 6.0, were investigated to determine any structural relationships with regards to kinetics and mutagenicity. The reaction with chlorine dioxide followed pseudo-first order kinetics, with the half life of the respective compounds being 36, 22 and 8 milliseconds. The formation of a dark precipitate in the reaction of tryptophan with HOCl precluded any kinetic comparison. The reaction products of tryptophan with hypochlorous acid (HOCl) or chlorine dioxide were mutagenic to Salmonella typhimurium TA98 and TA100; while those of N-methyltryptophan with HPCl and chlorine dioxide were more mutagenic toward TA98. Higher recoveries of the reaction products were achieved by passing the acidified (pH 2.5) mixture through an XAD-8/XAD-2 resin column. AS

Nutrition

2532 Hoyt (RW). Nutritional implications of high-tech foods. Activities Report 41(1); 1989; 79-85

TOXICOLOGY

Nil

FOOD LAWS AND REGULATIONS

Nil

GENERAL

2533 Amla (BL) and Muschiolik (G). Food research in India. Ernahrungsforschung 34(12); 1989; 51-54 (De).

The article gives a survey on the research results of the Central Food Technological Research Institute in Mysore. The institute has become an efficient research centre of the food industry and can show considerable results in both fundamental and applied research. Many CFTRI findings are put into effect by India's food and allied industries. Results in the field of food grain processing, fruit and vegetable processing, by-product utilization, processing of enzymes, animal products and convenience products are mentioned. Further work done by the institute is the development of several simple and effective methods of food grain storage and protection and the development of spice oleoresins (extracts). The traditional technologies for processing of cocoa have also been improved. Examples of CFTRI services are chemical and toxicological food analysis, the design of equipment for food processing, training courses, consultancy for a number of manufacturing concerns and importance as a centre for information on food science and technology. AS

2534 Bender (AE). What is natural. Food Chemistry 33(1); 1989; 43-51

The term `natural' with its emotive appeal, has been taken over by marketing men. At one time used mostly by the health food business, it has now spread so widely that restrictions are proposed on its use. There are clearly some uses which are blatantly misleading to the consumer and others where the term may be used reasonably, but in between these extremes is a vast area of doubt. Because of this, and the problem of laying down precisely just when the word (and similar emotive terms such as traditional and home-made) may be used, it is suggested that guidelines restricting the use of these terms should be voluntary, with a body that may give advice to manufacturers on the permitted use of the terms. Natural' foods are popularly considered both nutritious and safe but, in fact, many unprocessed, natural foods, contain known toxins and from time to time give rise to problems among consumers. AS

2535 Conning (DM). Food composition and human behaviour. Food Chemistry 33(1); 1989; 33-41

This brief review deals with food components that may influence behaviour by non-immunological mechanisms. Such components are classed as amaphylactoid, pharmacological and psychoactive, and the effects as stimulatory, depressant or hallucinatory though the latter category includes changes in mood not associated with hallucination at the concn. of substances present in foodstuffs. The main categories dealt with are immunological mediators, additives, vasoactive amines, xanthines, a range of phenethylamine derivatives and various glycoalkaloids. It is suggested that food choice may be as much influenced by the behavioural consequences of food components as by the more conventional attributes such as appearance, flavour and learned preference. 12 references. AS

2536 Cuthbertson (WFJ). What is a healthy food. Food Chemistry 33(1); 1989; 53-80

In this review author reported that all foods are healthy if they are consumed within the limits and unhealthy if eaten in excess. Therefore, the author reported the permitted levels of various nutrients to be consumed by an individual per day. The author also reported that food-borne diseases are arising mainly from pathogenic microorganisms that are arising from neglect of simple hygenic precautions, especially in the kitchens of private homes and catering establishments. 74 references. UJSPR.

2537 Ghosh (P). A taste for irradiated food. New Scientist 123(1671); 1989; 40-41

A general article discussing advantages of irradiation of foods. BV

2538 Mayo (N) and Michael (D-P). Development of and demand for new food and drink products. British Food Journal 90(5); 1988; 205-210

2539 Norris (JR). Modern approaches to food safety. Food Chemistry 33(1); 1987; 1-13

2540 Ridge (SR) and Cull (C). Recycling containers of liquids for human consumption. British Food Journal 90(5); 1988; 212-215

FOOD PROCESSING

2541 Garg (PK). Effect of processing on the removal of pyrethroid residues. Pesticides 22(12); 1988; 21-22

Water and cooking have been found to be satisfactory for removal of residues. Besides washing with detergents, hydrolytic degradation with alkali can also be successfully adopted. Aging of residues on the crop surface results in their decreased availability leading to less removal of the residues. Processing results in reduction of waiting period required for degradation of particular insecticides. BV

FOOD PACKAGING

2542 Chatterjea (BD). Emerging trends in food packaging. Modren Packaging Trends. (2); 1988; 7-17

2543 Pechey (R). What's new in food and drinks packaging. Modren Packaging Trends. (2); 1988; 23-24, 29

2544 Pherwani (SH). Opportunities in food processing industries. Modren Packaging Trends. (2); 1988; 19-21

2545 Scheunert (U). Present status and trends in packaging of foodstuffs. Lebensmittelindustrie 36(2); 1989; 49-51 (De).

FOOD ENGINEERING AND EQUIPMENT

2546 Tsaka (T), Steiner (I), Washuttl (J) and Kroyer (G). The effect of microwaves on cooking and frying foils made of polyterephatalic acid esters. Deutsche Lebensmittel-Rundschau 85(7); 1989; 213-216 (De).

Foils for roasting and baking made of polyterephthalates are commonly used for preparation of food in conventional cooking stoves. The effect of microwaves on foils of polyterephthalates compared with the effect of heat was examined. The loss of volatile organic substances, the global migration into destilled water, 10% ethanol and 3% acetic acid and the amount of terephthalic acid, isophthalic acid, phthalic acid, glycerol and diethylenglycol in these extracts were determined. The limiting values of the German Bundesgesundheits. AS

Engineering

2547 Lin (SS), Chiang (BH) and Hwang (LS). Recovery of perilla anthocyanins from spent brine by diafiltration and electrodialysis. Journal of Food Engineering 9(1); 1989; 21-33

Separation of perilla anthocyanins from sodium chloride in spent pickling brine was investigated using diafiltration (DF) and electrodialysis (ED). An ultrafiltration (UF) membrane of nominal mol. wt. cut-off of 2000 daltons was used for DF because of its satisfactory permselectivity for separating the pigment and salt. At an added-water vol. to original feed ratio of 4, constant-vol. diafiltration (CVDF) removed 95% of the salt, and sequential dilution diafiltration (SDDF) removed 87% of the salt from the brine. Both processes recovered more than 90% of the anthocyanins. During ED, increasing current density increased the salt removal rate, but also increased the power consumption and decreased the current efficiency. The ED process could remove 90% of the sodium chloride while recovering 86% of the anthocyanins from the spent brine. AS

2548 Povey (MJW). Ultrasonics in food engineering. Part II. Applications. Journal of Food Engineering 9(1); 1989; 1-20

This review discusses ultrasonics in food engineering its relevant applications in other industries and its future . It covers low intensity ultrasonics; applications of low-intensity ultrasonics and conclusions. NGKR

2549 Steinke (JA), Frick (C), Strassburger (K) and Gallagher (J). Interaction of flavour systems in the microwave environment. Cereal Foods World 34(4); 1989; 330-332

Microwave heated food products are magnificantly different from conventionally heated food products in colour, flavour and texture. Conventional heating of food products results in dehydration of the surface and thus favouring many flavour and colour reactions. Microwave heating can result in relatively low temp., and high water activities thus minimizing flavour colour and texture development. During microwave heating individual flavour components are to loss through distillation, flavour binding by starches and proteins and chemical degradation. This article discusses with data in flavour loss by distillation as affected by various microwaves media. PHR

ENERGY IN FOOD PROCESSING

Nil

FOOD CHEMISTRY AND ANALYSIS

Chemistry

2550 Yuan (CW), Marty (C) and Richard (H). Formation of pyrazines via a Maillard reaction using glycine ethyl ester and glyceraldehyde. Sciences des Aliments 9(1); 1989; 125-134 (Fr).

Among the numerous compounds which are produced during the Maillard reaction, the pyrazines play an important role in the olfactory perception of many heated foods. In order to develop the knowledge of pyrazine formation mechanism the reaction of glycine ethyl ester with glyceraldehyde has been studied. Four pyrazines were identified using electron impact mass spectrometry and a mechanism is proposed taking current literature into account. AS

2551 Yuan (CW), Rieux (J), Beauhaire (J), Fourrey (JL) and Richard (H). Evidence for the formation of a -1, 4 dihydropyrazine during a model study of the Maillard reaction. Sciences des Aliments 9(1); 1989; 135-146 (Fr).

Dihydropyrazine 3 has been synthetized via a Maillard type reaction. The observation of this new compound suggests the existence of a pathway for the formation of pyrazines which is different from the reaction of Strecker. During the latter reaction there exists a precursor, 1,4-dihydropyrazine, whose N is not substituted by the carbon chain of the initial amino acid. BV

Chemistry(Analytical)

2552 Anon. How to detect irradiated food. Food and Chemical Toxicology 26(8); 1988; 739-740

2553 Lau (O-W), Luk (SF) and Lam (RKM). Spectrophotometric method for the determination of sorbic acid in various food samples with iron (III) and 2-thiobarbituric acid as reagents. Analyst 114(2); 1989; 217-219

A simple rapid and accurate spectrophotometric method has been developed for the detn. of sorbic acid in various food samples based on the oxidation of sorbic acid by iron (III) at 100 C to malonaldehyde, which then reacts with 2-thiobarbituric acid to form a reddish brown. N

2554 Mosandl (A), Kustermann (A), Hener (U) and Hagenauer-Hener (U). Analytic differentiation of natural-identical Gamma-lactones in foodstuffs. Deutsche Lebensmittel-Rundschau 85(7); 1989; 205-209 (De.).

The direct stereo-differentiation of aroma active Gamma-lactones from different commercially available fruit-nectares is carried out with heptakis (3-O-acetyl-2, 6-di-O-pentyl) -Beta-cyclodextrin as the chiral stationary phase. Off-line coupling of HPLC and HRGC and multidimensional Gas chromatography (MDGC) resp. are applicated as alternative procedures for clean up and detection of chiral Gamma-lactones and the results of both methods compared. AS

2555 Pheil (MJ). Quality control of flavour compound scale-up by gas chromatographic analysis. Cereal Foods World 34(4); 1989; 325-329

This article deals with the principle of high resolution gas chromatography and its application in flavour analysis as a means of ensuring product quality. PHR

FOOD MICROBIOLOGY AND HYGIENE

Enzymes

2556 Zhou (R), Omran (H), Bai (Y), Tableros (M) and Gierschner (K). Isolation, purification and characterization of an endo-pectinylase (endo-PL). Zeitschrift fur Lebensmittel-Untersuchung und -Forschung 188(6); 1989; 551-556 (De).

This paper describes an endo-pectinlyase isolated on a preparative scale from the commercial enzyme preparation Pectinex Ultra SP-L by using chromatofocusing. The most important biochemical and physico-chemical properties are presented. The purity of this endo-pectinlyase was proved by analytical isoelectric focusing and by typical biochemical reactions. The following constants were determined: pl 3.9 K_m 1.91 mg/ml and K_{max} 0.88 min^{-1} . The enzyme has a pH optimum .of 6.0 with 71% esterified apple pectin and of 8.5 with a highly (94%) esterified pectin. Temp. optima with these two substrates were 60 C and 65 C resp. The enzyme showed a relatively high pH and temp. stability. Its activity was increased considerably in the presence of Na^+ ions. AS

Ethyl alcohol

2557 Schneider (H). Conversion of pentoses to ethanol by yeasts and fungi. CRC Critical Reviews in Biotechnology 9(1); 1989; 1-40

Review. 240 references. BV

Fermented foods

2558 Tamang (JP), Sarkar (PK) and Hesseltine (CW). Traditional fermented foods and beverages of Darjeeling and Sikkim- a review. Journal of the Science of Food and Agriculture 44(4); 1988; 375-385

The various ethnic groups of the Darjeeling district of West Bengal and Sikkim consume a var. of fermented foods including kinema (based on soybeans), gundruk (Brassica campestris leaves), sinki (radish, Raphanus sativus), mesu (bamboo shoots), churpi (milk), shel roti (rice preparation) and jnards (beers). This review covers their method of preparation and consumption. The flora of murcha, the starter culture of jnards, contains mainly Pediococcus, yeasts belonging to the genera Saccharomycopsis, Pichia and Saccharomyces and the moulds Rhizopus and Mucor. AS

Microorganisms

2559 Riedel (K), Renneberg (R), Wollenberger (U), Kaiser (G) and Scheller (FW). Microbial sensors. Fundamentals and application for process control. Journal of Chemical Technology and Biotechnology 44(2); 1989; 85-106

In this paper, the following aspects are discussed, microbial and physical basis of microbial sensors, immobilization of microbes, principle of measurement, approaches for enhancing the selectivity and sensitivity of microbial sensors, applications in bioreactor and environmental control of microbial sensors. BV

2560 Waites (W). Recent advances in rapid detection and enumeration of microorganisms. Food Science and Technology Today. 2(4); 1988; 256, 258

Bacteria

2561 Maconi (E) and Aragozzini (F). Stereoselective reduction of noncyclic ketones with lactic acid bacteria. Applied Microbiology and Biotechnology 31(1); 1989; 29-31

The ability to reduce 2-pentanone, ethyl acetoacetate and acetophenone was investigated among lactic acid bacteria. Results show that this transformation is not performed by homofermenting lactic acid bacteria, while heterofermenting sp. can reduce the substrates to the corresponding S alcohol in satisfactory yields, often with 100% optical purity. AS

Bacillus amyloliquefaciens

2562 Roychoudhury (S), Parulekar (SJ) and Weigand (WA). Cell growth and alpha-amylase production characteristics of Bacillus amyloiquefaciens. Biotechnology and Bioengineering 33(2); 1989; 197-206

Growth and alpha-amylase production characteristics of Bacillus amyloliquefaciens strain F (ATCC 23350) in batch cultures are examined using glucose or maltose as the carbon source. While the cell growth is rapid when glucose is used as the carbon source, higher cell mass, higher total and specific enzyme activities, and higher enzyme production rates are obtained when maltose is used as the carbon source. The overall specific enzyme activity decreases with an increase in the initial concn. of carbon source. The oxygen requirement and carbon dioxide generation vary linearly with the max. amount of cell mass produced. For exp. conducted using glucose as the carbon source, the kinetics of cell growth and glucose consumption are described using a special form of the Vavilin equation. For a given amount of initial carbon source, the enzyme synthesis capability is retained by the microorganisms, although at a substantially reduced level, under severe oxygen limitation. AS

Pseudomonas fluorescens

2563 Ishihara (K), Suzuki (T), Yamane (T) and Shimizu (S). Effective production of Pseudomonas fluorescens lipase by semi-batch culture with turbidity dependent automatic feeding of both olive oil and iron ion. Applied Microbiology and Biotechnology 31(1); 1989; 45-48

An automatic feeding system to supply olive oil in semi-batch culture was establihsed by monitoring cell concn. with a laser turbidimeter combined with microcomputer and a pluse motor. In this automatic feeding system, specific olive oil supply rate (g olive oil) (g dry cells)$^{-1}$ b^{-1}, q_0 was changed in an appropriate range. Attempts were made to produce lipase by a turbidity-dependent automatic fed-batch culture of Pseudomonas fluorescens. It was found from the semi-batch cultures with turbidity-dependent feeding of olive oil and with varied initial Fe ion concn. that excess Fe ion was inhibitory to formation of the lipase. Turbidity-dependent automatic simultaneous feeding of olive oil and Fe ion was performed to obtain semi-deficiencies of both oily substrate in the culture liquid and Fe content of the cells. Using this semi-batch culture, high lipase activity, 5600 units/ml, was attained at an optimal value of q_O . AS

Streptomyces rimosus

2564 Renko (M), Vitale (L), Kokalj (M) and Pokorny (M). Streptomyces rimosus extracellular proteases. Applied Microbiology and Biotechnology 31(1); 1989; 38-44

A trypsin-like proteinase was isolated from Streptomyces rimosus culture filtrates obtained from an oxytetracycline production process. The isolation procedure includes ultrafiltration, chromatography on CM-Sephadex, AH-Sepharose and CM-cellulose and gives a homogeneous protein with 19% yield. The enzyme is an anionic trypsin (M_r 28000, pI 4.5), is stable from pH 4.5 to 9 and up to 40 C, and contains three disulphide bridges, three histidines and three methionines per molecules. At its pH optimum (pH 8.4-8.8) it splits peptide, ester and arylamide bonds of arginine in the endo-position and, to smaller extent, in the exo-position. Like other streptomycetes trypsins, it is a more efficient catalyst than bovine trypsin and has a relative preference for peptide-arylamides, N alpha-hydroxyloxycarbonyl-L -norleucyl-L -prolyl-L-arginine-P -nitroanilide being by far its best substrate. AS

Fungi

2565 Shekhar Sharma (HS). Economic importance of thermophilous fungus. Applied Microbiology and Biotechnology 31(1); 1989; 1-10

A wide range of thermophilic and thermo-tolerant fungi can cause spoilage of bagasse, grain, groundunt, hay, palm kernels, peat, wood chips and other agricultural crops. Thermophilous fungi are also reported to be involved in the processing of agricultural produce such as cocoa, guayule and tobacco; biodegradation of lignocellulose, animal and other wastes in controlled conditions. The habitat of thermophilous fungi ranges from hot natural environment to man-made environments such as coal spoil tips and aircraft fuel tanks. AS

Aspergillus niger

2566 Honecker (S), Bisping (B), Yang (Z) and Rehm (HJ). Influence of sucrose concentration and phosphate limitation on citric acid production by immobilized cells of Aspergillus niger. Applied Microbiology and Biotechnology 31(1); 1989; 17-24

Immobilized cells of Aspergillus niger needed a lower initial sucrose concn. than free cells in order to obtain maximal yields of citric acid production. High sucrose concn. led to reduced yields and increased polyol formation (glycerol, erythritol, arabitol). Continuous fermentation with media containing low sugar concn. prevented the formation of polyols. The change from nitrogen-limited to phosphate-limited precultivation of immobilized spores significantly increased the productivity of the mycelium. The ratio of citric acid to residual sugar in the effluent distinctly lay in the direction of citric acid. Inside the alginate beads mainly large bulbous cells were observed. AS

2567 Maldonado (MC), Strasser De Saad (AM) and Callieri (DA). Regulatory aspects of the synthesis of polygalacturonase and pectinesterase by Aspergillus niger sp. Sciences des Aliments 9(1); 1989; 101-110

A strain of Aspergillus niger isolated from rotten lemons produced polygalacturonase (PG) and pectinesterase (PE) in a synthetic medium with glucose as sole carbon source, indicating that at least to some extent, the enzyme were constitutive. However, production of these enzymes increased markedly with pectin, galacturonic acid or polygalacturonic acid as carbon sources. The inducing effect of these substance as well as the inhibitory effect of glucose was less in the case of PG. For both enzymes the best inducer was pectin. The results obtained growing the microorganisms in a medium containing the inducer and cycloheximide or actinomycin D, showed that the induction occurs at the transcription level. AS

Mushrooms

2568 Audouin (P), Vidal (JP) and Richard (H). Volatile compounds from aroma of some edible mushrooms. More (Morchella conica), wood blewitt (Lepista nuda), clouded agaric (Clitocybe nebularis), and false chanterelle (Hygrophoropsis aurantiaca). Sciences des Aliments 9(1); 1989; 185-193

By gas chromatography-mass spectrometry (GC-MS), around 140 constituents were identified in the aroma extracts of four different var. of mushroom (Morchella conica pers., Lepista nuda Cooke, Clitocybe nebularis Kummer et Hygrophoropsis aurantiaca Maire). 1-octen-3-ol was present in all the var. Linalool could well be a key compound in clouded agaric and wood blewit aroma. The differences in comp. led us to think that the analysis method was well adapted to the sp. differenciation and the aroma quality of mushrooms. AS

Rhizopus

2569 Seaby (DA), McGacken (AR) and Blakeman (JP). Experimental determination of requirements for the growth of edible Rhizopus species for use in solid substrate fermentation systems. Journal of the Science of Food and Agriculture 44(4); 1988; 289-299

Rhizopus oryzae and R. oligosporus germinated best in a starter culture of 5% V8 juice. R. oligosporus had a higher optimum temp. for germination and growth than R. oryzae. R. oryzae utilised starch and nitrogen-containing salts but not urea in liquid culture. Optimum mycelial growth on membranes on agar was achieved where the protein to carbohydrate ratio of substrates was between 0.4 and 0.5 R. oryzae gave higher yields than R. oligosporus. The results will be used to optimise solid substrate fermentation systems for these fungi. AS

Yeasts

2570 Lurton (L), Segain (JP) and Feuillat (M). Proteolysis during the autolysis of yeasts under acidic conditions. Sciences des Aliments 9(1); 1989; 111-124

This study is aimed at a better understanding of proteolysis occuring in yeasts (Saccharomyces cerevisiae), during an autolysis performed at pH 3, as it occurs in wine. The effect of four protease inhibitors (pepstatin, EDTA, PMSF and mercuric chloride) on total N, amino-nitrogen and amino acids liberation by yeasts during autolysis processes, was studied. A total inhibition of proteolysis was obtained whether by the association of the four inhibitors or by heat. In both cases and whatever the autolysis pH, about 30% of the yeast nitrogenous content is liberated from the cell; free amino acids from the intracellular pool represent about 14 of these compounds. Glutamic acid and alanine widely predominate in their repartition. The liberation of nitrogenous compounds consecutively to proteolysis is max. at pH 5, where it represents 60% of the yeast nitrogenous content, and mainly consists in amino acids. At pH 3, only 40% of the yeast nitrogenous content can be liberated by proteolysis: amino acids only represent 13% of the released compounds, dominated by peptides. The specific inhibition of protease A by pepstatin almost entirely prevents the proteolytic process at pH 3, while it has almost no effect at higher pH. This demonstrates the primordial role played by protease A in proteolysis under acidic conditions. Amino acids liberation at pH 3 is completely inhibited by PMSF, mercuric chloride or pepstatin while EDTA has almost no effect. These results suggest that carboxypeptidase Y could be the main exopeptidase acting at this pH, and that it needs an activation process performed by protease A. AS

Baker's Yeast

2571 Champagne (CP), Goulet (J) and Lachance (RA). Fermentative activity of baker's yeast cultivated on cheese whey permeate. Journal of Food Science 54(5); 1989; 1238-1240, 1254

Fermentative characteristics of Baker's yeast (Saccharomyces cerevisiae) produced on two cheese whey ultrafiltrate media (one in which lactose was hydrolyzed and one pre-fermented by Streptococcus thermophilus) were compared to those of yeast produced on molasses. Fermentative activity of yeast grown on molasses was superior to that of cells produced in whey. Addition of sucrose to pre-fermented whey ultrafiltrate (FWU) in the final stage of the fermentation increased fermentative activity. Fermentative activity of three strains grown on FWU varied considerably, certain strains being better adapted to the whey media. Breads produced with yeast grown on FWU were identical to those obtained with cells grown on molasses. AS

Saccharomyces cerevisiae

2572 Bar (R). Cyclodextrin-aided microbial transformation of aromatic aldehydes by Saccharomyces cerevisiae. Applied Microbiology and Biotechnology 31(1); 1989; 25-28

Biotransformation of benzaldehyde and vanillin by growing cells of Saccharomyces cerevisiae was performed in an aqueous medium containing either Alpha-or-Beta-cyclodextrin at the same molar concn. as the substrate. The yeast fermentative activity, as reflected by carbon dioxide evolution, and bioconversion to the corresponding alcohols were both faster and greater in the presence of the cyclic dextrins. Clearly, cyclodextrins were shown to significantly alleviate the inhibitory effects of the aromatic aldehydes. AS

Hygiene

2573 Boer (H-G). The antimicrobial regime of kitchen hygiene. Ernahrungsforschung 34(12); 1989; 48-49 (De).

Characteristics of the transmission process of infectious diseases in communal kitchens are explained. A synopsis is given of the antimicrobial regime of kitchen hygiene and its complement by environmental factors and organizational measures. The well-known "hurdle-principle" of food microbiology is supplemented by a "barrier-principle". AS

BIOTECHNOLOGY

2574 Anon. Status of biotechnology in future. Pesticides 23(5); 1989; 18

2575 Atthasampunna (P), Suwana-Adth (M) and Bhumiratana (A). Current biotechnological developments in Thailand. CRC Critical Reviews in Biotechnology 9(1); 1989; 41-59

Review. 59 references. BV

2576 Tischler (M) and Wilhelm (B-U). Development of biotechnological processes applying mathematical statistical methods. Lebensmittelindustrie 36(2); 1989; 52-56 (De).

TISSUE CULTURE

2577 Draget (KI), Ostgard (K) and Smidsrod (O). Alginate based solid media for plant tissue culture. Applied Microbiology and Biotechnology 31(1); 1989; 79-83

A new method for solid medium plant tissue culture based on in situ gelation of alginate is proposed as an alternative to agar-based media. In situ gelation by the use of dispersed calcium carbnate and the slowly hydrolysing acid glucono-o-lactone (GDL) was the basis for the use of alginate as a gelling agent. Inexpensive alginate-based media can be made in a wide range of pH values. Biological tests of these gels, concerning sterile seed growth and microcalli plating of Brassica napus (cv. Topas) and biomass production of Panax ginseng callus, showed results equal to those achieved with agar-based gels. AS

2578 Yamamoto (H) and Tabata (M). Correlation ot papain-like enzyme production with laticifer formation in somatic embryos of papaya. Plant Cell Reports. 8(4); 1989; 251-254

A protease similar to papain was produced by somatic embryos of Carica papaya in association with the development of laticifers containing characteristic vesicles which probably originated from the endoplasmic reticulum. In contrast to somatic embryos, a papain-like protease was not detected in either friable or compact calus cultures which failed to develop laticifers. These observations strongly suggest that the differentiation into laticifers is required for papain production in papaya. AS

FOOD ADDITIVES

2579 Eliasson (A-C) and Ljunger (G). Interactions between amylopectin and lipid additives during retrogradation in a model system. Journal of the Science of Food and Agriculture 44(4); 1988; 353-361

The retrogradation of waxy maize starch in the presence of surfactants and emulsifiers was measured by differential scanning calorimetry. It was found that a surfactant (cetyltrimethylammonium bromide) and unsatuated monoglycerides reduced retrogradation, whereas lecithin and a soybean oil influenced the retrogradation to a lesser extent. The effects were greater after 1 day of storage than after 7 days, and the influence of the surfactant was greater at + 25 C than at + 7 C. Different storage temp. led to crystallised forms of amylopectin with different melting temp. Further, an amylopectin sample was affected by the presence of a surfactant in a way similar to the waxy maize starch. AS

2580 Kahan (S) Liquid chromatographic method for determination of vanillin and related compounds in vanilla extract. Collaborative study. Journal of the Association of Official Analytical Chemist's 72(4); 1989; 614-618

A liquid chromatographic method for detn. of vanillin, vanillic acid, p-hydroxybenzaldehyde, and p-hydroxybenzoic acid was collaboratively studied. The compounds are separated on a reverse phase C-8 column using an acidic 10% methanol solvent and are detected at 254 nm. Recoveries for the 4 compounds present in vanilla extract ranged from 94 to 99%. Method of performance as measured by repeatability and reproducibility standard deviations (S_r and S_R) and relative standard deviations (RSD_r and RSD_R) resp., for detn. of the 4 flavour compounds in authentic and adulterated vanilla extracts were as follows: p-hydroxybenzoic acid-s_r 0.29, S_R 0.39, RSD_r 8.98%, RSD_R 11.68%; p-hydroxybenzaldehyde-s_r 0.92, S_R 1.20 RSD_r 6.16% RSD_R 6.95%; Vanillic acid S_r 0.85, S_R 1.12, RSD_r 7.47%, RSD_R 9.97%; Vanillin-S_R 7.50; RSD_r 3.43%, RSD_R 3.48%. The method has been approved interim official first action. AS

2581 Mosandl (A), Kustermann (A), Palm (U), Dorau (H-P) and Konig (WA). Stereoisomeric flavour compounds. XXLIII. Direct chirospecific HRGC-analysis of natural Gamma-lactones. Zeitschrift fur Lebensmittel-Untersuchung und -Forschung 188(6); 1989; 517-520

Naturally occurring chiral Gamma-lactones have been directly stereoanalysed by high-resolution gas chromatography (HRGC) on hexakis (3-O-acetyl-2,6-di-O-pentyl)-alpha-cyclodextrin as a chiral stationary phase. Optically pure (4R)-configurated Gamma-deca-and Gamma-dodecalactone were identified from strawberries. The stereoisomers of 3-methyl-4-octanolide ("quercus"-or "whisky" lactone) from different oak woods are also reported. Different amounts of cis/trans "whisky" lactones were detected, but the chiralities were always (3 S, 4S)-cis and (3S, 4R)-trans, as ascertained by coinjection with optically pure references. Chirality as an essential criterion of naturally occurring aroma compounds is discussed. AS

2582 Vidal (JP), Fort (JJ), Gaultier (P) and Richard (H). Vanilla aroma extraction by dense carbon dioxide. Sciences des Aliments 9(1); 1989; 89-100

Vanilla yields vary with the extraction pressures and the amount of ethanol in dense carbon dioxide (DCD). However, at 85 to 100 bars and 20 C, the extraction of Madagascar samples of Bourbon vanilla pods with DCD containing 2.4% ethanol gives an extract reminiscent of the freshly prepared pods with a yield of 8.5 plus or minus 0.2%. This extract contains 25% vanillin, which corresponds to a very good extraction level (92.8%) of this compound. The recovery kinetics show that the half extraction time, t_1 2/, is 30-40 min. The method of beans grinding has a great influence upon extraction yields. AS

Antimicrobials

2583 Annapurna (J), Iyengar (DS), Nagabhushan Rao (S) and Bhalerao (UT). Antimicrobial activity of leaf extracts of Annona squamosa. Pesticides 23(1); 1989; 43-44

The present study deals with the relative effectiveness of leaf extracts of Annona squamosa on different fungal pathogens (Alternaria alternata, Colletotrichum gleosporioides, C. dematium, Curvularia lunata, Myrothecium roredum, Prechslera specifera) and bacteria (Bacillus subtilis, Staphylococcus aureus, Pseudomonas aurginosa and Salmonella typhimurium). The nature of the active compounds are briefly discussed in view of the observed activity in methanol and water. BV

2584 Llabres (CM) and Rose (BE). Antibacterial properties of retail sponges. Journal of Food Protection 52(1); 1989; 49-50

Seven brans of cellulose sponges and one polyurethane var. have been evaluated for inhibiting properties on tweleve strains of gram positive and gram negative bacteria. Polyurethane and expanding cellulose sponges were the only var. which did not show antibacterial properties. CTD

Colourants

2585 Saito (K) and Fukushima (A). Effect of exogenous substance on carthamin red colouration. Food Chemistry 26(2); 1987; 125-138

2586 Taylor (AJ) and Clydesdale (FM). Assessment of tinctorial power of food colourants. Food Chemistry 26(1); 1987; 1-10

Caramel

2587 Dross (A) and Baltes (W). The fractionation of caramel ingredients depending on their mol masses. Zeitschrift fur Lebensmittel-Untersuchung und -Forschung 188(6); 1989; 540-544 (De).

The ultrafiltration of caramel colours, produced by caustic, ammonia or ammonium sulphite processes, has shown that they contain 15-25% of compounds with mol. masses below 500 Da and over 30% below 1000 Da. However, colour formation starts with products having higher mol. masses with a max. of over 10 kDa. The proportion of these in the samples tested was only about 25-35%. The separated fractions were subjected to Curie-point pyrolysis gas chromatography/mass spectrometry. The structures of the most important fragments are listed. AS

Emulsifiers

2588 Toro-Vazauez (JF) and Regenstein (JM). Physicochemical parameters of protein additives and their emulsifying properties Journal of Food Science 54(5); 1989; 1177-1185, 1201

The relationships between protein solubility, surface hydrophobicity (Ho), free sulphydryl (SHF) and disulphide (SSB) content and time of emulsification that determine the emulsion activity index (EAI) and emulsion stability (ES) of five protein additives were investigated at two different ionic strengths (Z = 0.54 and Z = 0.46, pH 6.5). The variables that described EAI at Z = 0.054 were associated with protein disperability and Ho, while protein rigidity factors explained most of the EAI variability at Z = 0.46. The ES models showed similar variable relationship as the EAI models at the same Z. The differences between models at different Z indicated that the relationships between the variables were affected by the ionic strength. AS

Sweeteners

2589 Makinen (KK) and Isokangas (P). Relationship between carbohydrates, sweeteners, and oral diseases. Progress in Food and Nutrition Science 12(1); 1988; 73-109

Review. 162 references. BV

CEREALS

2590 Bangert (BA). The quality of cereal foods. Food Chemistry 33(1); 1989; 15-26

This review deals with different aspects of the quality of cereal foods viz. organoleptic quality, nutritional quality, quality in respect of food safety and also dealt with some thoughts about future trends in cereals foods. UJSPR

2591 Rasco (BA), Borhan (M) and Owusu-Ansah (Y). Effect of drying technique and incorporation of soluble solids on the chemical composition and colour of distillers grain products. Cereal Foods World 34(4); 1989; 346-349

Six drying systems (atmospheric drum, steam tube,vacuum rotary, tunnel, microwave vacuum, and pulsed jet combustion) were evaluated for the production of distiller's grain products from soft white wheat. The effect of the different drying techniques on the recovery of soluble solids in the finished product, its chemical composition, and the visual and instrumental colour were determined. The drum-dried product was lighter in colour than products dried by other methods. The use of rotary vacuum drying, steam tube, tunnel, or a combination of steam tube and tunnel during resulted in a lower recovery of soluble solids in the finished products. Colour data for distillers grain products from other feedstock grain (corn, barley, milo, and rice) are also presented. AS

2592 Van Twist-de Graaf (MJ), Wieser (H) and Hekkens (WTJM). Immunocrossreactivity of antisera against grain prolamines of wheat, rye, barley and oats. Zeitschrift fur Lebensmittel-Untersuchung und -Forschung 188(6); 1989; 535-539

Prolamines extracted from wheat (gliadin), rye (secalin), barley (hordein) and oats (avenin) were used to raise antibodies in rabbits. The four prolamines were separated by SDS-PAGE and blotted onto nitrocellulose. The immunocrossreactivity of the separated prolamines with the four antisera was studied. The close botanical relationship between wheat and rye, and to a lesser extent barley, is clearly established. The crossreactivity of gliadin, secalin and hordein with anti-avenin serum was found to be weak. In contrast, avenin shows a strong crossreactivity with anti-gliadin serum. AS

Barley

2593 Clancy (JA) and Ullrich (SE). Analysis and selection program for malt quality in barley by microcomputer. Cereal Chemistry 65(5); 1988; 428-430

An analysis and selection program for malting barley quality was developed using Lotus 1-2-3 spreadsheet software. The program stores the raw data for one agronomic and nine quality traits, performs all calculations, executes a selection index based on an evaluation of the levels and the importance of each trait to overall malt quality. The data may then be queried to select breeding lines for any set of criteria contained in the data base that is desired by the breeder. This program affords barley breeders an efficient method of summarizing the quality traits of experimental lines and a relatively objective means of selecting for overall malt quality. It is adaptable to selection of other traits and to other crops as well. AS

Paddy

2594 Dakshinamurthy (A). Effect of certain plant products of storage pests of paddy. Tropical Science 28(2); 1988; 119-122

The effects of certain plant products on the development and cross infestation of some major pests of stored paddy have been studied. It was seen that eucalyptus leaf powder at the rate of 1% by wt. when mixed with paddy was found to be quite effective in preventing the development of Angonmois grain moth and cross infestation by the lesser grain borer. NGKR

Rice

2595 Biswas (SK) and Juliano (BD). Laboratory parboiling procedures and properties of parboiled rice from varieties differing in starch properties. Cereal Chemistry 65(5); 1988; 417-423

Differences in rate of water absorption during steeping and steaming of rough rice due to differences in starch gelatinization temp. (GI) may be minimized by soaking for 8 h at 60 C and steaming for 10 min at 1.0 kg/cm^2 steam pressure (120 C) or 30 min at 100 C. The water content of parboiled rice was higher for low-GT rice than for intermediate -GT rices steamed at 100 C only. In 12 rices parboiled at 100, 120, and 127 C, apparent amylose content was the major factor influencing parboiled rice properties such as brown rice bending hardness, head rice yield, equilibrium water content, gel consistency and viscosity, and cooked rice hardness and stickiness. Gelatinization temp. was an important factor only in rices parboiled at 100 C, probably because it affected parboiling rate at that temp. Differences in degree of parboiling because of differences in GT resulted in different relations between parboiled rice properties and raw rice quality factor samples parboiled at 100, 120 and 127 C. Thus, raw rice equality factors, particularly apparent amylose content, may be used in breeding programs as an index of parboiled rice quality. Gel consistency of brown and milled rice in 0.1 N GOH was contributed to soften on parboiling. AS

2596 Enevoldsen (BS) and Juliano (BO). Ratio of A chains to B chains in rice amylopectins. Cereal Chemistry 65(5); 1988; 424-427

The ratio of A chain and B chains of rice amylopectins from two pairs of near isogenic lines differing in the waxy gene was determined by the action of pullulanase and of beta-amylase plus pullulanase on the beta-limit dextrins followed by the detn. of maltotriose in the digests by quantitative gel filtration chromatography. Maltotriose is derived from A chains by the action of pullulanase on the beta-limit dextrin and from A and B chains by the combined action of beta-amylase and pullulanase. Waxy and nonwaxy (low amylose) rice amylopectin were shown to have similar ratios of A to B chains of 1.1-1.5, despite differences in and freeze-thaw stability. AS

Brown rice

2597 Clarke (PA) and Dada (LO). The effect of dehusking on the quality of brown rice. Tropical Science 28(2); 1988; 141-142

In this short communication two dehusking system viz a rubber roll device, satake THU 35 A lab. dehusker and a centrifugal device, Cecoco two-man hand huller type A a manually powered dehusker of 250 kg/h capacity capable of being motorised have been described. The product yield i.e brown rice plus paddy showed a significant difference in flavour of the rubber roll machine. The overall yield of brown rice was found to be identical and it is noted that the centrifugal system resulted in more breakage at the dehusking stage. The mean kernel wt. of the product of the centrifugal machinewas lower than that of the rubber roll machine. However further investigation will be necessary to determine whether these limited lab. studies and relevant in commercial operations. NGKR

Wheat

2598 Faridi (H) and Finley (JW). Improved wheat for baking. CRC Critical Reviews in Food Science and Nutrition 28(2); 1989; 175-209

This review covers wheat production, classes of wheat, wheat quality, (protein quality of hard wheats, prerequisities for good breadmaking quality, genetic factors and wheat hardness), wheat grading for quality factors, overall specifications for hard and soft wheats, factors affecting wheat quality (wheat yield), environmental and agronomic factors, (effect of fertilizers, effect of climate on wheat quality and increase in the number of wheat cvs) and bakers concern (bread manufacturers, cookie and cracker manufacturers). 39 references. BV

2599 Wasowicz (E), Kaminski (E), Kollmannsberger (H), Nitz (S), Berger (RG) and Drawert (F). Volatile components of sound and musty wheat grains. Chemie Mikrobiologie Technologie der Lebensmittel 11(6); 1988; 161-168

The volatile components of wheat grains were isolated using standard-controlled simultaneous extraction/distillation, and were investigated using capillary gas chromatography and coupled gas chromatography-mass spectrometry (GC/MS). Water content, microbial status, sensorial properties, and composition of volatiles were closely correlated from the three samples examined. Two trace compounds exhibiting the typical, intensive musty odour of the microbially strongly contaminated wheat samples were enriched using two-dimensional GC, and identified as 2-methylisoborneol and geosmine using sniffing -GC/MS. AS

MILLETS

Corn

2600 Martin (CR), Czuchajowska (Z) and Pomeranz (Y). The effects of wetting corn and broken corn and foreign material on aquagrams. Cereal Chemistry 65(5); 1988; 431-432

Combine-harvested corn from two hybrids was air-dried at ambient temp. in a bin to about 12% moisture, dried in the lab. to 10.5% moisture, and then rewetted to microwave the moisture to 15.5%. The distribution gradient of moisture in freshly wet corn kernels was highest in corn without any broken corn and foreign materials (BCFM) and decreased as the percentage of BCFM increased. Most of the added moisture was absorbed by the 3-5% BCFM in the sample. Aquagram standard deviations of freshly wet corn with or without BCFM were much higher than in corn equilibrated to 15.5%, or even 17.20% moisture. Within 24-48 h this moisture was more uniformly transferred to the whole corn kernels. AS

2601 Montaville (TJ) and Goldstein (PK). Sodium bicarbonate inhibition of aflatoxigenesis in corn. Journal of Food Protection 52(1); 1989; 45-48

Data relating to the effect of sodium and ammonium bicarbonate on growth and aflatoxin production by Aspergillus parasiticus has been presented. Aflatoxin levels of sodium bicarbonate-treated (0.17% w/w) corns were reduced to one-third at 30 C for three wks compared to control, while both the salts inhibited growth, only sodium bicarbonate reduced aflatoxigenesis. CTD

2602 Weller (cL), Paulsen (MR) and Steinberg (MP). Correlation of starch recovery with assorted quality factors of four corn hybrids. Cereal Chemistry 65(5); 1988; 392-397

A lab. wet-milling process was developed for use in determining starch recovery of yellow dent corn. The effects of harvest moisture and drying air temp. on starch recovery were investigated for four hybrids. A split split-plot experimental design was used to evaluate the effects. Starch recovery was not significantly different among the hybrids; however, it did decrease as both harvest moisture and drying air temp. heated. Starch recovery was correlated with quantitative measures of assorted quality factors. Regression analysis found starch recovery to be function of starch content, test wt. and ethanol soluble protein. AS

PULSES

2603 Nielsen (SS). Degradation of bean proteins by endogenous and exogenous proteases. A review. Cereal Chemistry 65(5); 1988; 435-442

Bean proteins are degraded by proteases when human and insects utilize the protein for food and during germination of the seed. Whereas human digestive enzymes generally act on heat-denatured bean proteins, enzymes in the germinated seed and in the bean weevil must degrade native bean proteins. Unlike the germinated seed and the bean weevil, which utilize a cysteine proteinase along with other types of enzymes to degrade bean proteins, human depend largely on acid and serine proteases. Comparing the breakdown of bean proteins by various proteases in these hree system leads to a better understanding of bean protein structure and nutritive value. AS

Black beans

2604 Roa (V), Destefano (MV), Perez (CR) and Barréiro (JA). Kinetics of thermal inactivation of protease (trypsin and chymotrypsin) inhibitors in black bean (Phaseolus vulgaris) flours. Journal of Food Engineering 9(1); 1989; 35-46

This paper reports the kinetics of thermal inactivation of trypsin and chymotrypsin inhibitors in black bean (Phaseolus vulgaris) flours as a function of the water activity of the product. For both inhibitors two periods of distinct thermal resistance were determined at temp. above 100 C each following a first order reaction kinetics model and showing a max. thermal sensitivity at water contents corresponding to the range of intermediated moisture values. NGKR

Cowpeas

2605 Fashakin (JB) and Fasanya (JI). Chemical composition and nutritive changes of some improved varieties of cowpea (Vigna unguiculata). 1. Some selected varieties from the International Institute for Tropical Agriculture, Ibadan, Nigeria. Tropical Science 28(2); 1988; 111-118

The chemical comp. and nutritive changes of some improved var. of cowpea (Vigna unguiculata) from the Internationl Institute for Tropical Agriculture, Ibadan, Nigeria have been studied. The var. were assessed for chemical, physical and organoleptic properties. The protein ranged from 21.5 to 27% Fe ranged from 8 to 15 mg/100g, Ca ranged from 13.5 to 20.8 mg/100g. When the var. were compared the highest preference was for cowpeas of var. II which was not the most nutritive group. The implications of these improvements in relation to the amelioration of nutritional deficiencies in developing countries have been discussed. NGKR

Cowpea flour

2606 Ukhun (ME). Browning phenomenon in stored raw cowpea (Vigna unguiculata) flour. Food Chemistry 26(1); 1987; 23-29

Direct evidence (decreases in `L'-values) is established for a browning phenomenon in raw cowpea flour. Changes in the contents of reducing sugar, and lipids with free amino groups with changes in water activity and temp., during a 6-month storage, suggest the participation of these entities in the browning observed. The observed trend in pH changes appeared to be related, at least in part, to browning reactions. AS

Faba beans

2607 Eskin (NAM) and Johnson (S). Isolation and partial purification of phytase from Vicia faba minor. Food Chemistry 26(2); 1987; 149-155

Phytase was partially purified from small faba beans by ammonium sulphate fractionation and Sephadex gel filtration. Phytase activity coincided with phosphatase activity, suggesting it may be part of the general group of phosphatases. Kinetic studies showed that the properties of faba bean phytase were similar in general to those of phytases from other sources. Faba bean phytase was inhibited by the presence of substrate concn. greater than 1.5 mM. AS

OILSEEDS AND NUTS

Groundnuts

2608 Mostafaf (MM). Nutritional aspects of thermal and irradiation processing of peanut kernels and their oil. Food Chemistry 26(1); 1987; 31-45

Rapeseeds

2609 Vermorel (M), Heaney (RK) and Fenwick (GR). Antinutritional effects of the rapeseed meals, Darmor and Jet neuf, and progoitrin together with myrosinase in the growing rat. Journal of the Science of Food and Agriculture 44(4); 1988; 321-334

The antinutritional effects of rapeseed meals from cvs Darmor (`low' glucosinolate) and Jet neuf (`high' glucosinolate) both fed for 30 d, and of the purified rapeseed glucosinolate, progoitrin (fed for 23 d), have been examined in rats, with and without the glucosinolate-degrading enzyme, myrosinase. With all of the experimental diets, feed intake was significantly reduced, the effects being more pronounced in the final period of the exp. Both types of rapeseed meal significantly reduced live wt. gain, and addition of myrosinase enhanced this effect during the second half of the experiment. Organ wt. were usually increased in animals fed the experimental diets. The diet containing progoitrin and myrosinase increased liver wt. by 58%. In agreement with other workers, thyroid wt. were found to be greatly increased by the feeding of rapeseed meals or progoitrin together with myrosinase, although large increases in the size of this organ are also observed in the absence of this enzyme. The major antinutritional effects observed in this study became evident after 10-15 d, explaining the lack of such effect in eariler, short-term experiment. The results support the view that progoitrin is a major factor limiting the more extensive use of rapeseed as an animal feedingstuff. AS

Soybeans

2610 Ramakrishna (MBV), Mital (BK), Gupta (KC) and Sand (NK). Determination of phenolic acids in different soybean varieties by reversed phase high performance liquid chromatography. Journal of Food Science and Technology, India 26(3); 1989; 154-155

Phenolic acids in different soybean var. were determined by reverse phase HPLC using a Bondapack C_{18} column. The soybean var. contained gallic 0.16-2.89, protocatechuic 0.20-0.54, chlorogenic 1.70-8.30, p-hydroxy benzoic 0.72-2.70, vanillic and caffeic 1.49-7.88, syringic 4.12-4.70, p-coumaric 1.79-4.30 and ferulic 1.71-4.16 µ g/g. Most of the var. contained 2 to 6 phenolic acids except `PK-416' which had all the nine phenolic acids. AS

Soy products

2611 Bruckner (J), Hoppe (K) and Mieth (G). Fermented and non-fermented foodstuffs on basis of soybeans. Lebensmittelindustrie 36(2); 1989; 57-61 (De).

The present status of the manufacture of food products and additives based on soybeans in various parts of the world is given. Technology of their production and comp., possibility and limits of production and marketing of the products in Asia, America, Europe and GDR is discussed. BV

Soy milk

2612 Asano (M), Okubo (K) and Yamauchi (F). Effect of squeezing temperature on quality of soy milk. Journal of Japanese Society of Food Science and Technology '(Nippon Shokuhin Kogyo Gakkaishi') 36(4); 1989; 318-324 (Ja).

"Namashibori" on Tofu processing is a squeezing and separating step into soy milk and the residue at mild temp. after crushing soybeans swelled with water, and today, this step is eliminated from moder Tofu processing in Japan. But the Tofu prepared by the process including the "Namashibori" step was more preferable than the ordinary Tofu. Therefore, it was suggested that the effect of squeezing temp, on quality of soy milk and Tofu has been important. In order to make optimum temp. clear, the effects of squeezing temp. on yield, viscosity, glycoside content, lipoxygenase activity and n-hexanal level of soy milk squeezed over 30 C from the cotyledon and at 60 C from the whole bean. Viscosity of soy milk significantly decreased with increasing temp. and showed a min. value at 60 C. A glycoside content as solid increased in temp. squeezed above 50 C and was approx. 2.6 times higher in soy milk at 95 C than at 20 C. The lipoxygenase activity, which is the major cause of undesirable flavour of soy milk, decreased in soy milk squeezed with increasing temp., and it was not detected in soy milk squeezed over 70 C. n-Hexanal, which was produced by lipoxygenase, was about half in soy milk squeezed at 60 C as compared with 20 C. Accodingly, optimum squeezing temp. on soy milk and Tofu processing was recommended in range of 50-60 C. AS

TUBERS AND VEGETABLES

2613 Shankargounda Patil, Chikkasubbanna (V) and Narana Gowda (JV). Effect of pre-harvest sprays of triacontanol on the storage life of lettuce (Lactuca sativa L.) cv. Great lakes. Journal of Food Science and Technology, India 26(3); 1989; 156-157

Preharvest sprays of triacontanol (TRIA) reduced the loss of ascorbic acid and bacterial decay in prepacked lettuce heads, but had no effect on physiological loss in wt. and storage life. But TRIA sprays improved the storability of lettuce heads packed in polyethylene bags (7.22 and 6.66 days in polythene bags without vents and with 0.20% vents resp.). AS

Root vegetables

Beetroots

2614 Drdak (M), Vallova (M), Daucik (P) and Greif (G). Effect of fermentation on the composition of the red beet pigments. Zeitschrift fur Lebensmittel-Untersuchung und -Forschung 188(6); 1989; 547-550

This paper deals with changes in the representation of pigments in red beet (Beta vulgaris, var rubra) during preparation of the pigment by fermentation under different conditions. For the separation of pigments, HPLC and gel chromatography were used. On a column of Sephadex G-25 the fermented juice was separated into five colour bands in which products of enzymatic and non-enzymatic browning were identified, as well as a mixture of vulgaxanthines and betacyanides, betanine and isobetanine, betanidine and isobetanidine. The last zone contained betalamic acid and yellow decomposition products which were not exactly defined. AS

2615 Feng (B), Cuvelier (G) and Brouard (F). Softening of ground beets during heat treatment. Sciences des Aliments 9(1); 1989; 77-88

A kramer cell has been used to monitor the texture of ground sugar and fodder beets during heat treatment in the 50 to 100 C temp. range. Softening comprised two first-order phases; an initial rapid drop in firmness followed by a slower decrease. Kinetic studies of heat treatment of the ground tissue at 60 C suggested that plasmolysis was largely responsible for the effects noted during the first phase. The second phase would appear to be defined by physicochemical changes in tissue components induced by heat treatment. Application of the Arrhenius equation to the effect of temp. on the first mechanism indicated apparent activation energies of 105 kJ/mol and 82 KJ/mol for the ground sugar and fodder beets resp. The Arrhenlus equation was not applicable over the whole temp. range tested for the second mechanism, which appears more complex. AS

Onions

2616 Farva (D) and Joseph (PK). Toxic effects of excess onion extracts in rats. Journal of Food Science and Technology, India 26(3); 1989; 171-172

When aqueous extracts of onions were fed to rats on a high fat diet (HFD) the triacylglycerols and the total cholesterol in the serum, liver and kidneys were reduced significantly, but there was a significant rise in urea, creatinine and total and direct reacting bilirubin. SGOT (EC 2.6.1.10) and SGPT (EC 2.6.1.2) rose marginally above normal, levels, while LDH (EC 1.1.1.27) and alkaline phosphatase (EC 3.1.3.1.) in the serum remained within normal limits. Total proteins and albumin in the serum, and blood glucose were significantly reduced by feeding onion extracts 2.5 g/100 g body wt. Thus, consumption of large quantities of onion extracts may produce undesirable side effects. AS

Cassava

2617 Akinyosye (FA), Fawole (MO) and Akinyanju (JA). Studies on the microbiology of the fermentation of cassava tuber for the production of an indigenous food. Chemie Mikrobiologie Technologie der Lebensmittel 11(6); 1988; 169-174

The microbiology of cassava tuber fermentation for the production of an indigenous food, `lafun' was investigated. A study of the microbial population of the rhizophere, rhizoplane of the cassava tuber, river water employed for steeping and the fermentation broth strongly suggests that the microorganisms responsible for cassava tuber fermentation have their origin mainly from the cassava tuber rhizosphere. A combination of bacteria and fungi in ordered succession appeared to be responsible for cassava fermentation into `lafun' The implicated microorganisms were Leuconostoc mesenteroides, Corynebacterium manihot, Lactobacillus plantarum, Micrococcus luteus and Geotrichum candidum. The proper retting of cassava tuber for the production of `lafun; was found to require four days. The pH of the fermenting mixture declined with days of fermentation with a corresponding increase in the total titratable acidity. AS

2618 Wickham (LD) and Wilson (LA). Quality changes during long-term storage of cassava roots in moist media. Tropical Science 28(2); 1988; 79-86

In this investigation the effect of storage of cassava roots in moist media for periods in excess 3 months on the development of vascular streaking, physical appearance and cooking quality has been studied. Three cassava cvs. are taken for these studies. The changes in physical appearance for successive development of callus tissue and adventitious roots after 4 wks storage, development of secondary stroage roots after 6 wks etc. resulted in loss in quality of roots. The cooking quality was found to be good in stored roots after 6 wks but in case of unharvested roots the cooking quality remained good after harvest of the stored roots which showed that storage of cassava roots of some cvs still offered the best method for long term storage and need for identification of suitable var. for ideal long storage has been indicated. NGKR

Potatoes

2619 Shashirekha (MN) and Narasimham (P). Pre-planting treatment of seed potato tuber pieces to break dormancy, control tuber piece decay to improve yield. Experimental Agriculture 25(1); 1989; 27-33

Lab. exp. and field tests were used to study the effects of 7 antimicrobial agents and a trace element salt mixture (TEM) on the decay of cut pieces of seed potatoes. The effect of a mixture of gibberellic acid and ethrel (GA + E), TEM and TEM with GA + E on the sprouting behaviour and yield of tubers was also studied. All the antimicrobial agents inhibited decay, although TEM and oxine were superior to other treatments. There was an increase in crop yield when seed tubers were treated with TEM. In lab. tests, the GA + E mixture and TEM were effective in breaking dormancy. AS

Truffles

2620 Di Cesare (LF), Senesi (E) and Allievi (C). A white truffle aroma concentrate. Sciences des Aliments 9(1); 1989; 161-168

A white truffle (Tuber magnatum pico) aroma concentrate was prepared by stripping off a white truffle homogenate. The distillate was then concentrated by adsorption on an apolar sorbent (Kastel KS112 polystyrene resin). By GC-MS analysis, 45 compounds were detected in this aroma concn. Three volatiles were identified as the odorous principles of white truffles; bis-(methylthio) methane, tris-(methylthio) methane and methy-(methylthio) methyidisulphide. Diferent technological uses are suggested for the conc. AS

Vegetables

Cabbages

2621 McLellan (KM) and Robinson (DS). The heat stability of purified spring cabbage peroxidase isoenzymes. Food Chemistry 26(2); 1987; 97-

107

Two peroxidase isoenzymes, purified from extracts of Spring cabbage, have been shown to possess different heat-stabilities. The anionic isoenzyme had an isoelectric point of 3.7 and was relatively heat stable, while the cationic isoenzyme, pI9.9, was more readily inactivated by heat. Neither isoenzyme showed regeneration of peroxidase activity following heat inactivation. AS

Tomatoes

2622 Efiuvwevwere (BJO). Effects of refrigerated storage on surface colour and acidic constituents in tomatoes grown in Northern and Southern Nigeria. Tropical Science 28(2); 1988; 103-109

The effect of refrigerated storage on surface colour and acidic constituents in tomatoes grown in Northern and Southern Nigeria have been investigated. Three different types viz. Berdel Gombe and Gabon tomatoes were obtained at the orange red stage and stored at 3 plus or minus 1 C for 0, 4, 8, 12, or 16 days and fruits from each type were taken at regular intervals and surface colour, titratable, total and bound acidities, pH, were evaluated. The results showed surface colour increased to max. on day 8 and decreased later. Highest colour was noticed in Bendel var. and lowest in Gabon type with storage time the acidities decreased while pH increased. Garbon fruits had higher acidity than others. The relationship between pH and acidity differed with fruit type. These results will decide the quality deterioration, processing and safety of the tomato products. NGKR

2623 Thorne (SN) and Efiuvwevwere (BJO). Changes in organic acids in chilled tomato fruit (Lycopersicon esculentum Mill). Journal of the Science of Food and Agriculture 44(4); 1988; 309-319

In this investigation the authors reported the influence of different storage temp., time and ripening duration on changes in organic acids, titratable total and bound acidities, and pH of tomato fruits. They also reported the detn of the individual organic acid concn. and pH of pitted and adjacent unpitted pericap tissues. UJSPR

2624 Tripathi (RN) and Nirankar Nath. Effect of starch dipping on quality of dehydrated tomato slices. Journal of Food Science and Technology, India 26(3); 1989; 137-141

Tomato slices turn brown during drying and storage and their rehydration is poor. In this study, pre-treatment were developed to overcome these problems. Whole tomatoe of `Pant T-2' var. was blanched for 60 sec. in boiling water, 2.5% brine or 0.25% KMS, slices dipped in various solutions and dried to about 4% moisture in a cabinet drier. Blanching reduced pectin methyl esterase activity by 31.6%. Dipping brine blanched slices in sulphited starch for 2.0 min at room temp. before drying improved the rehydration ratio and colour as indicated by lycopene content and extent of browning. Ascorbic acid decreased from 582.5 to 28.0 mg/100 g solids during drying. Dried product contained 233.5 mg sulphur dioxide per 100 g solids.

There was negligible change in total lycopene of product during drying and the red colour was retained well during 6 months storage under ambient conditions. AS

FRUITS

2625 Carbonell (E), Costell (E) and Duran (L). Evaluation of various methods for measurement of pectin content in jam. Journal of the Association of Official Analytical Chemist's 72(4); 1989; 689-693

Suitability, precision, and accuracy of 3 colorimetic methods to measure pectin content in fruit jams are examined. The methods resolve non-uronide interferences in different ways : (1) with 3, 5-dimethylphenol colorimetric reagent, and absorbance differences measured at 450 and 400 nm; (2) with m-hydroxydiphenyl colorimetric reagent, and numeric correction of sample blank to compensate for interferences; and (3) with m-hydroxydiphenyl colorimetric reagent and removal of interferences by purification of sample pectins. The 3, 5-dimethylphenol method is not suitable when fructose is present. Precision and accuracy of the second method are not satisfactory because sugar/pectin ratio in jam samples is very high. The third method is recommended because the precision (0.9% less than or equal to CV less than 6.4%) is good and recovery is nearly 100%. AS

2626 King (K). Method for rapid extraction of pectic substances from plant materials. Food Chemistry 26(2); 1987; 109-118

A method is described for the rapid extraction of pectic substances from alcohol insoluble solids (AIS) from material of plant origin, especially fruit. Samples of AIS can be prepared for galacturonic acid assay within 60 min using extraction with 0. 5 M HCl in Fibertec-I system (Tecator) for 30 min. The extraction conditions are carefully standardised and operator error is reduced by the elimination of transfer steps, particularly during filtration. The results obtained for plant-derived alcohol insoluble solids containing from 10% to 33% pectic substances were in close agreement with those obtained by enzymic hydrolysis using a commercially available enzyme preparation (Ultrazyme). The method will have application in the rapid, routine estimation of pectic substance in plant materials. AS

Apples

2627 Perring (MA) and Pearson (K). Redistribution of minerals in apple fruit during storage. Effect of storage atmosphere on magnesium and phosphorus concentrations. Journal of the Science of Food and Agriculture 43(2); 1988; 109-119

The medium transverse redistribution of Mg and P in Cox's Orange Pippin apples stored at 2.8 C or 4 C was investigated. The more detailed investigation at 4 C showed that P accumulated in the core zone throughout storage in air, but that the inward movement of

Mg was delayed in the early wks when Mg concn. increased in the peel. Storage atm. of 2 or 1.25% oxygen (< 1% carbon dioxide) inhibited movement of both elements to the core zone and, for a few wks follows the establishment of a 1.25% oxygen atm., Mg was withdrawn from the core zone. An inward shift of Mg from the peel to the inner cortex occurred several wks prior to the development of visible low temp. breakdown symptoms in apples stored in 1.25% oxygen. Similarities between the effects of low oxygen and low temp. storage on the redistribution of Mg and P and on the induction of low temp. breakdown are discussed. AS

Dates

2628 Al-Samarraie (AI), Al-Hafdh (E), Abdul-majed (K) and Basumy (MA). The chemical control of the lesser date moth, Batrachedra amydraula meyr. and residue levels of organophosphate insecticides in dates. Pesticide Science 25(3); 1989; 227-230

Larvae of the lesser date moth (Batrachedra amydraula Meyr.) cause damage to dates in Iraq. A formulation based on a mixture of equal tparts of wheat flour and pollen grains and containing either chlorpyrifos, fenitrothion or pirimiphos-methyl (all at 5 mg kg^{-1}) was dusted (5 g formulation $bunch^{-1}$) onto female clusters of dates at the time of pollination. Number of larvae, yield of dates and insecticide residues were monitored over a three months period. Residues were determined using gas chromatography with flame photometric detector. Results showed that, by this technique, all three insecticides were effective in controlling the pest; and fenitrothion and chlorpyrifos were better than pirimiphos-methyl. SGB

Guavas

2629 Yusof (S), Talib (Z), Mohamed (S) and Bakar (AA). Use of response surface methodology in the development of guava concentrate. Journal of the Science of Food and Agriculture 43(2); 1988; 173-186

A response surface methodology (RSM) was used for the detn. of optimum pH, processing temp. and Brix to produce an acceptable guava concn. These three factors were used as independent variables whose effects on colour and viscosity of the concn. as well as on titratable acidity, body (mouthfeel), flavour and overall acceptability of the reconstituted juice were evaluated. The R^2 values for colour, titratable acidity and overall acceptability were greater than 0.9. Analysis of the regression coeff. showed that the pH of the concn. was the most important factor affecting the characteristics of the product as it exerted a highly significant influence on the colour of the concn. as well as on titratable acidity, flavour and overall acceptability of juice. The colour, titratable acidity and overall acceptability were affected by Brix whereas temp. influenced only suitable colour were pH 2.4 -2.9, 75-81 C and 48-55 Brix, or pH 4.0, 87-95 C and 46 Brix. For acceptable flavour, pH 3.3-3.6, 78-86 C and 50.9 Brix are required, and for max. overall acceptability, pH 3.3-3.9, 79.1 C and 35-55 Brix. AS

Mangoes

2630 Spalding (DH), King (JR) and Sharp (JL). Quality and decay of mangoes treated with hot water for quarantine control of fruit fly. Tropical Science 28(2); 1988; 95-101

Immersion in water for 60-90 min at 46 C of mature-green mango fruit (Mangifera indica L. cvs `Tommy Atkins' and `Keitt') a possible quarantine treatment that destroys immatures of the Caribbean fruit fly (Anastrepha suspensa (Loew)-did not damage market quality. Mangoes immersed in water for 60-120 min at 46 C or for 60 min at 49 C, then stored for 3 days at 13 C and ripened at 24 C, exhibited a higher percentage of ripe peel colour compared with untreated fruit; but ripening time, pH, total titratable acidity, ascorbic acid, and percent soluble solids were not affected. Lenticels were darker on Tommy Atkins immersed in water for 120 min at 46 C, on Keitt immersed in water for 90 min at 46 C, and on both cvs immersed in water for 60 min at 49 C, compared with untreated fruit. Anthracnose, caused by Colletotrichum gloesoporiodes, was reduced on Keitt, and stem-end rot, caused by Diplodia natalensis or Phomopsis citri, was reduced on both cultivars immersed in water at 46 or 49 C. Internal breakdown and hollow pockets in the flesh were not affected by hot water treatment. AS

Strawberries

2631 Douillard (C) and Guichard (E). Comparison by multidimensional analysis of concentrations of volatile compounds in fourteen frozen strawberry varieties. Sciences des Aliments 9(1); 1989; 53-76

The volatille components of fourteen frozen strawberry var. were isolated by direct dichloromethane extraction. Analysis by gas chromatography coupled with mass spectrometry led to the identification and quantification of 61 compounds. Special attention was paid to quantifying furaneol and meslfurane which are considered by many authors as key components for strawberry aroma. Principal component analysis and discriminant analysis were applied to the data in order to characterize and differenciate the var. Var. were divided into three groups. Cluster 1 included those which contain low amounts of volatiles, cluster 2 was represented by lactonic compounds, cluster 3 included the three richest var. Meslfurane and furaneol were found in large amounts in some var. such as confltura, Jesco and Tloga, however Cambridge and Elvira did not contain meslfurane and Cardinal no furaneol. AS

CONFECTIONERY, STARCH AND SUGAR

Confectionery

2632 Anon. The use of xylitol in confectionery prodution. Confectionery Production 55(2); 1989; 150-151, 164

The role of xylitol in the prevention of dental caries with its consequent implications for confectionery manufactures is discussed. Xylitol is not only an alternative sweetener with no caries promoting properties, but also contribute to improved dental health by interfering with the formation of new cavities and the progression of existing caries. SYR

2633 Jeffery (MS). Fats in low boilings. Manufacturing Confectioner 68(12); 1988; 87-90

The role and type of fat used in various confectionery products are briefly described. The products mentioned are: nougats, toffees, caramels, fudges and chews. It is better to choose the fat which gives good stability in that particular environment and also which gives the optimum mouthfeel and texture to the product. SYR

2634 Lees (R). The production of jelly confections. Part 2. Confectionery Production 55(1); 1989; 60-62

The article briefly describes various types of starches their fluidity, gel strengths and setting properties in the preparation of jellies. It also describes briefly about pectin jellies regarding various types, gel strengths, pH ranges etc. Typical faults and their causes are shown in tables. SYR

2635 Lees (R). The production of jelly confections-Part 3. Confectionery Production 55(2); 1989; 162

The article briefly describes about the gelling agents agar and gum arabic and their use in preparation of jellies. SYR

Chocolates

2636 Hogenbirk (G). Viscosity and yield value for chocolate and coatings-what they mean and how to influence them. Confectionery Production 55(1); 1989; 82-83

The effect of certain emulsifiers on rheological properties of chocolate and coatings is briefly described. The effects of conche types on moisture reduction and in turn viscosity and yield value of chocolate and coatings are briefly mentioned. SYR

Starch

2637 Aguerre (RJ), Suarez (C) and Viollaz (PE). Swelling and pore structure in starchy materials. Journal of Food Engineering 9(1); 1989; 71-80

This work was carried out to elucidate whether or not starch contains any appreciable microporous structure. For this purpose the specific surface areas of different starchy materials were determined by means of the t-method, their values being practically constant in the range of water activities 0.10-0.80. The straightness of the v-t plots observed in all cases indicated the absence of an intrinsic microporous structure. In the absence of a pore structure and high values of the specific surface areas have been attributed to the interlamellar expansion of the starch granule structures on absorption of water. NGKR

2638 Riedel (HR). Thoughts on starch moulding systems. Confectionery Production 55(1); 1989; 81, 83

The type of starches to be used as the casting medium when making various confections such as fondant creams, jellies, gums etc. are briefly mentioned. SYR

Sugar

Sucrose

2639 Cecil (JE). Effect of pH on sucrose losses by inversion during boiling in the open pan sulphitation process. Tropical Science 28(2); 1988; 133-139

In this investigation the effect of pH on sucrose losses by inversion during boiling in the open pan sulphitation process was studied. Cane juice was limed and sulphited to different levels of pH, then clarified and evaporated in a standardized way which was comparable to open pan sulphitation sugar industry. The results showed that sucrose, potassium ratios were measured to assess sucrose loss, but no significant loss was seen between 6.5 to 7.5 pH whereas 10% loss was reported in literature. Some invert sugar destruction occuréd above 7.2 pH. The mud produced in the experimental work was efficiently filtered using a novel and inexpensive vacuum filter with more efficient mud filtration techniques it would increase the yields of product in some OPS factories and would reduce the environmental pollution. NGKR

BAKERY PRODUCTS

2640 Heinze (RF). Developing microwavable flavours for popcorn and cakes. Cereal Foods World 34(4); 1989; 334-339

The author in this article has discussed on approach to the development of flavours for microwave popcorn and for microwave cakes. A brief explanation of flavour comp. and how the popcorn and cake microwave processes affect added flavour is given in this article. PHR

2641 Ulinski (TJ). Flavouring low water activity fruit fillings for bakery goods. Cereal Foods World 34(4); 1989; 323-324

This feature article deals with composition of bakery fruit filling and problems in their formulations. PHR

Biscuits

2642 Rogers (P). The biscuit industry. Implications of trends in consumer behaviour and changes in the retail environment. Manufacturing Confectioner 68(12); 1988; 41-47

It is a general article dealing the implications of trends in consumer behaviour and changes in the retail environment of biscuit industry. In general, changes in consumer demographics are resulting in a range of demands for: smaller package sizes, broader distribution, packaging convenience, preparation of convenience, quality, freshness, broader array products and trusts in brand names. SYR

Bread

2643 Venkateswara Rao (G) and Indrani (D). Studies on the use of artifical sweeteners in sweet bread and biscuits. Journal of Food Science and Technology, India 26(3); 1989; 142-144

Artifical sweeteners-saccharin, aspartame and acesulfame-K were used to replace sugar in the preparation of sweet bread and biscuits. The specific vol. (3.57 to 3.61 ml/g) of loaves containing artifical sweeteners was comparable to that (3.59 ml/g) of control bread. The crust colour of bread was light brown as against brown of control. The adverse effects of artificial sweeteners on biscuit dough properties, colour, crispness and spread factor were overcome by using 20% sorbitol in place of sugar in the formula. The sweeteness intensity of sweet bread and biscuits containing artificial sweeteners was comparable with that of control bread and biscuits. AS

MILK AND DAIRY PRODUCTS

2644 Griffiths (MW). Listeria monocytogenes. Its importance in the dairy industry. Journal of the Science of Food and Agriculture 47(2); 1989; 133-158

This review outlines current knowledge of the incidence of Listeria monocytogenes in raw milk and its incidence in, and ability to survive, the manufacturing process for other dairy products, notably soft cheeses. Discrepancies in results obtained by researchers concerning growth of the organism at refrigeration temp. and the bacterium's ability to survive pasteurisation are discussed. 32 references. BV

2645 Hourigan (JA). The critical control point approach to dairy product quality. Australian Journal of Dairy Technology 43(2); 1988; 75-78

Various steps essential for undertaking HACCP in a milk plant are elaborated. JSS.

Milk

2646 Corzo (N), Ramos (M), Olano (A), Calvo (MM), Amigo (L) and Martinez-Castro (I). Effect of storage of changes of carbohydrate and protein fractions of milks submitted to different thermal treatments. Chemie Mikrobiologie Technologie der Lebensmittel 11(6); 1988; 175-180

Changes on carbohydrate and protein fractions during storage at room temp. of commercial UHT and sterilized milk samples were studied. Degradation of caseins was observed by polyacrylamide gel electrophoresis (PAGE). Whey protein fraction showed a marked denaturation for in-container sterilized milk, appearing a band migrating in PAGE between seroalbumin and alpha-lactalbumin. This band remained unaltered during storage. Clear distinction can be made between milk samples according to the lactulose content (22, 63, and 142 mg/100 mL in directly UHT, indirectly UHT and sterilized milk, resp.). No significant changes on lactulose content were observed during storage of UHT milk samples. In sterilized samples the lactulose content increased by approx. 20%. AS

2647 Hussein (L), Elsayed (S) and Foda (S). Reduction of lactose in milk by purified lactase produced by Kluyveromyces lactis. Journal of Food Protection 52(1); 1989; 30-34

The data presented relates to purification of lactose from cell-free extracts of Kluyveromyces lactis and some of its characteristics and its catalytic properties with lactose of milk or substrate. CTD

2648 Jarrett (WD), Mitchell (GE) and Dulley (JR). The Queensland dairy factory interlaboratory testing program. Australian Journal of Dairy Technology 43(2); 1988; 58-60

A program for testing reproducibility of liquid milk products, testing is described. The program includes two microbiological and nine chemical tests and 25 lab. are participating. Samples are prepared, spiked if necessary, at a centralized point, chilled and despatched in ice packing. The data are compiled and reporting format of three types sent to each lab., tabulated, histogram and graphical style of a yarden two samples plot. JSS

2649 Kwee (WS), Dommett (TW) and Vos (AC). Fluorogenic medium for differential gram negative, gram positive and total bacterial counts in liquid milks. Australian Journal of Dairy Technology 43(2); 1988; 50-53

The use of a medium containing the fluorogen 8-anilino-I-naphthalene sulphonic acid (ANS agar) for the simultaneous enumeration of gram-negative (GN), gram-positive (GP) and total bacterial counts is described. Two experiments were performed. In exp. 1, the colony morphologies and viable bacterial counts of 68 GN and GP isolates on this agar were studied. In exp. 2, 34 milk samples with unknown bacterial flora were plated on the agar, and presumptive GN and GP colonies were counted, isolated and identified. Results indicated that total bacterial counts by the ANS methods showed no significant differences from those by the standard pour plate and the spread plate methods. Using unknown mixed bacterial inocula, 93% of 58 presumptive GN colonies and 97.6% of the 84 presumptive GP colonies picked were correctly chosen. AS

2650 Kwee (WS), Dommett (TW) and Vos (AC). Application of a membrane filtration methods for the detection of gram negative bacterial contamination in pasteurized milk. Australian Journal of Dairy Technology 43(2); 1988; 54-57

A method involving membrane filtration followed by culturing on selective agar was developed to improve the sensitivity of detecting Gram negative bacteria in pasteurized milk. The method involves enzymatic pretreatment of a milk sample at 43 to 48 C for 10 min and rapid filtration of 10 to 14 mL through a 47 mm diameter, 0.6 mm pore size polycarbonate membrane filter, with minimal loss in apparent total number of bacteria recovered. A gram negative selective medium (PBAC-ANS) allowed the growth of 98% of 50 gram negative isolates and prevented the growth of 92.4% of 79 gram positive isolates. Of the isolates which grew on the medium, 71.4% of the gram negatives showed fluorescent intensity of less than or equal to 2 and 83.5% of the gram positives had fluorescent intensity of < 2. AS

2651 Levadaux (W), Johnson (M) and Andre (G). Monitoring the degradation of commercial microbial rennet preparation. Journal of Dairy Science 72(3); 1989; 627-634

Fractionation on a DEAE-Sephadex A-50 column was used to study the degradation of microbial rennets derived from submerged cultures of Mucer michei and compared with two commercial preparation marzyme and Rennilass. Specific activity of the enzymes declined with passage of time which was also evident in the alterations of profiles of peaks. JSS

2652 Min (DB), Lindamood (JB), Lee (SH), Chang (KS) and Reineccius (GA). Effect of packaging conditions on the flavour stability of dry whole milk. Journal of Food Science 54(5); 1989; 1222-1224, 1245

The flavour stability of dry whole milk packed with air, nitrogen, or a mixture of 92% nitrogen and 8% hydrogen (NH) in gas-impermeable pouches containing palladium as a catalyst was evaluated by measuring headspace volatile, oxygen, carbon dioxide contents using gas chromatography, brown colour formation by reflective spectroscopy, and sensory scores. The headspace volatile and carbon dioxide contents of the dry whole milks packed with air or nitrogen were significantly higher ($P < 0.05$) than the samples packed with NH. Brown colour formation and sensory scores of products packed with air were significantly different ($P < 0.05$) from the samples packed with 92% nitrogen and 8% hydrogen. The flavour stability of dry whole milk could be increased by packaging the products with NH in pouches containing palladium. AS

2653 Minagawa (E), Kaminogawa (S), Tsukasaki (F) and Yamauchi (K). Debittering mechanism in better peptides of enzymatic hydrolysates from milk casein by aminopeptidase T. Journal of Food Science 54(5); 1989; 1225-1229

The bitter peptide fraction present in casein hydrolysates obtained by using three proteases (subtilism, papain and trypsin) was treated with aminopeptidase T from Thermus aquaticus YT-1. The bitterness of the bitter peptide fraction could be decreased, and it sometimes disappeared completely, with an increase in free amino acids. The percentage of total free amino acids released from each bitter peptide fraction (subtilisin, papain and trypsin) by aminopeptidase digestion for 20 h were approx. 11%, 8.7% and 6.5% resp. Bitter peptide (Alpha$_s$ -1-CN f91-100) was isolated from a tryptic hydrolysate of casein by HPLC, its threshold value of bitterness being 2.9 p.p.m. (w/v). The peptide (Alpha$_s$ -1-CN-f96-100) obtained from the amino peptidase digestion of this bitter peptide showed no bitterness. AS

2654 Mittal (SB), Hourigan (JA), Zadow (JG) and Nguyen (MH). Behaviour of UHT recombined and UHT recombined lactose hydrolysed milk during storage at different temperatures. Australian Journal of Dairy Technology 43(2); 1988; 64-73

Changes occuring in 13 characteristics of the two types of UHT milk were studied and effect of storage at 5 C and 30 C monitored. It was found that UHT recombined milks could be prepared and stored for prolonged periods. JSS

2655 Murphy (SC), Cranker (K), Senyk (GF), Barbano (DM), Saeman (AT) and Galton (DM). Influence of bovine mastitis on lipolysis and proteolysis in milk. Journal of Dairy Science 72(3); 1989; 620-626

Lipolysis and proteolysis in milk were determined before, during, and after experimentally induced mastitis. Streptococcus agalactiae was infused into one quarter of five cows to elicit an infection. Milk protease activity was higher during infection, but milk lipase activity was unchanged. Lipolytic damage to milk fat and proteolytic damage to milk casein occurred in the udder prior to milking during an infection. Lipolysis increased due to increased susceptibility of the milk fat to lipase action during infection. The mechanism of the increased susceptibility of the fat to lipolysis was not determined. After infections were eliminated, SCC, initial and stored FFA concn., and initial tryosine values returned to preinfection levels. However, after infections were eliminated, milk protease activity as determined by an increase in tyrosine values remained elevated as milk SCC returned to preinfection levels. Protease activity returned to preinfections levels within 10 d after SCC returned to preinfection levels. AS

2656 Nsofor (LM). Variation in curd firmness of cold-stored raw milk from individual cows. Journal of Food Science and Technology, India 26(3); 1989; 158-160

A decrease in curd firmness occurred among chymosin coagulated milk samples with and without added 0.02% CaCl on cold storage (4 C for 24/48 h). Raw milk samples from individual Holstein cows were used in this study. Milk samples were coagulated with chymosin in the Formagraph instrument at 37 C. Milk samples with poor coagulation characteristics after storage showed an average decrease of 27.7% in curd firmness as compared to 6.1% decrease among good coagulating samples after cold storage for 48 h. Blended good- and poor-coagulating samples with CaCl showed less decrease in curd firmness than those without added CaCl. AS

2657 Oamen (EE), Hansen (AP) and Swartzel (KR). Effect of ultra-high temperature steam injection processing and aseptic storage on labile water soluble vitamins in milk. Journal of Dairy Science 72(3); 1989; 614-619

Whole milk standardized to 3.25% milk fat and 12.0% total solids was processed by direct steam injection. Two treatments at 149 C for 3.45 seconds and 138 C for 20.3 seconds were given. Samples were aseptically packed by a tetrapak AB3-250 into laminated paper flexible pouch. Effectiveness of thermal treatment and deaeration were negligible. Storage at 24 C caused following losses; 32.5% vitamin C, 17.9% vitamin B12, 12,5% folic acid, 3.4% vitamin B6, and 2.6% vitamin B2. Storage at room temp. for 20 wks resulted in a 100% loss of vitamin B12, 96% vitamin B6, 85% vitamin C, 32% folic acid and negligible change for vitamin B2. JSS

2658 Roginski (H). Fermented milks. Australian Journal of Dairy Technology 43(2); 1988; 37-46

History of fermented milks is given. Fermented milks classified into milks (9 types), butter milks (3 types) and cultured creams (2 types), and various types of starter cultures are described. Steps involving preparations are outlined, new trends in the field is described. The most important fermented milks such as yoghurt, kefir, cultured buttermilk and milks fermented with human intestinal bacteria are briefly characterized. Health related claims are briefly discussed. JSS

Milk products

2659 Scott (KJ) and Bishop (DR). Nutrient content of milk and milk products. Vitamins of the B complex and vitamin C in retail creams, ice creams and milk shakes. Journal of the Science of Food and Agriculture 43(2); 1988; 193-199

In this paper the results of study on the water soluble vitamin content of creams, ice creams and milk shakes sold in retail market in UK has been presented. The results showed that the concn. of vitamins in creams reflected to varying extents the level of fat and heat processing method. These concn. in both dairy and non-dairy ice creams were found to be similar and the amounts of the vitamin in milk shakes were found to be similar to those in pasteurised milk. NGKR

Cheese

2660 Aworth (OC) and Muller (HG). Cheese making properties of vegetable rennet from sodom apple (Calotropis procera). Food Chemistry 26(1); 1987; 71-79

Yield, chemical comp. and texture profile of cheese made with vegetable rennet from sodom apple leaves were compared with those of a direct acid cheese made with calf rennet. Yield, moisture, fat and protein contents were 14.47%, 49.70%, 26.15% and 20.0% resp., for cheese made with vegetable rennet and 12.45%, 44.80% 29.84% and 20.4% resp., for the direct acid cheese made with calf rennet. Cheese made with vegetable rennet had less soluble nitrogen than that made with calf rennet despite the fact that vegetable rennet was more proteolytic in casein solution than calf rennet. Relative to that made with calf rennet, cheese made with vegetable rennet was harder, less cohesive and more gummy, presumably because of differences in chemical comp. and physical characteristics between the cheeses. AS

2661 Griffith (R) and Hammond (EG). Generation of Swiss cheese flavour components by the reaction of amino acids with carbonyl compounds. Journal of Dairy Science 72(3); 1989; 604-613

Ability of carbonyls to generate flavours from various amino acids at room temp. using aqueous Lactobacillus bulgaricus cultures was evaluated. Gas chromatography and mass spectrometery was used for the identification of aromatic components. Amino acids responsible for flavour generating were identified. JSS

2662 Scott (JK) and Bishop (DR). Nutrient content of milk and milk products. Vitamins of the B complex and vitamin C in retail cheeses. Journal of the Science of Food and Agriculture 43(2); 1988; 187-192

The information on the water soluble vitamin content of 42 different var. of cheese sold in retail market in UK was updated by a survey undertaken in UK. NGKR

2663 Sweeney (MA) and Ashoor (SH). Fortification of cottage with vitamin A and C. Journal of Dairy Science 72(3); 1989; 587-590

Regular cottage cheese were fortified with vitamins A and C at levels of 2500 IU and 35 mg perserving resp. (113.6 g). The samples were stored at 3 C for two wks along with unfortified control samples. Cheese samples were analysed at zero time and after two wks of storage for pH, acidity, and vitamins A and C. The samples were also evaluated for odour, taste and appearance. JSS

Cheddar cheese

2664 Lemieux (L), Puchades (R) and Simard (RE). Size-exclusion HPLC separation of bitter and astringent fractions from Cheddar cheese made with added Lactobacillus strains to accelerate ripening. Journal of Food Science 54(5); 1989; 1234-1237

Lactobacillus strains were added as an adjunct to the regular lactic starter in Cheddar cheese manufacture in order to accelerate ripening. Microbial cheese proteolysis resulted in the release of free amino acids which were extracted with the stringent and bitter fractions and separated by size-exclusion and reversed-phase HPLC chromatography. Lactobacillus strains generally increased the degree of proteolysis. L. plantarum and L. brevis produced off-flavour possibly due to an accumulation of medium-size peptides. The control cheese (without lactobacilli) had the most peptides with a mean mol. wt. of < 1000 daltons and had flavour described as slightly bitter. Addition of L. casei-casei L24 accelerated ripening and yielded a well-aged Cheddar cheese without any bitterness even after 7 months at 6 C. AS

Milk powder

2665 Aguilera (JM) and Kessler (H-G). Properties of mixed and filled type dairy gels. Journal of Food Science 54(5); 1989; 1213-1217, 1221

Skim milk powder(SMP), a whey protein conc. (WPC) and fat globules with modified membranes were used for the fabrication of mixed and filled dairy gels. Firmness and syneresis of pure gels varied broadly with pH and total solids (TS). Mixing SMP and WPC at 10% TS showed synergistic effects on gel firmness, particularly for 50:50 blends, and addition of fat provided further reinforcement. Syneresis of gels and their appearance changed from high and clear to low and turbid, resp. as the WPC content was increased. Microstructural studies revealed the porous structure of the parent gels, compatability between both protein sources and between fat globules and the protein matrix. AS

Paneer

2666 Singh (L), Mohan (MS), Puttalingamma (V) and Sankaran (R). Preservation of paneer by sorbic acid. Journal of Food Science and Technology, India 26(3); 1989; 129-132

Paneer made from standardised milk had 56-60% moisture and pH 5.5 to 5.8. The initial microbial profile of the product was total plate count 2.3×10^3, proteolytics 7.4×10^2 lipolytics 4.9×10^2 and ungi 10 per g. The shelf life varied from few h at 25-35 C room temp. to 10 days at 5 C. Addition of 0.15% sorbic acid to the milk before preparing paneer or wrapping the paneer in sorbic acid coated butter paper ($2\ g/m^2$) extended the shelf life to 36 days at ambient temp. The same shelf life at 5 C was achieved by the addition of 0.05% sorbic acid in milk. The sorbic acid content in paneer varied from 0.15% to 0.3%. AS

Quarg

2667 Sheth (H), Jelen (P), Ozimek (L) and Sauer (W). Yield, sensory properties, and nutritive qualities of quarg produced from lactose-hydrolyzed and high heated milk. Journal of Dairy Science 71(11); 1988; 2891-2897

Quarg was produced from homogenized milk with or. without lactose hydrolysis or prior heating to 95 C for 15 min. Increased yields of 9.2 and 13.3% were obtained for unhydrolyzed and were hydrolyzed high heated milk resp., in comparison with the corresponding unheated milk. The recovery of whey proteins in quarg from high heated milk was 40.5% in unhydrolyzed milk and 42.7% in hydrolyzed milk. No effect of lactose hydrolysis on yield was observed. The time required to attain the desired pH 4.5 in the quarg fermentation was reduced in lactose-hydrolyzed milk by 7.1 and 4.6% for the unheated and high heat-treated milk, resp. The results of sensory evaluation indicated that heating resulted in graininess and hydrolysis plus high heating induced an unclean flavour in the quargs. In nutritional evaluation by bioassay methods, no differences were found in protein digestibility among any of the quargs studied; however, protein efficiency ratio, biological value, and net protein utilization values indicated that lactose hydrolysis plus high heating had a negative effect on the nutritional value of milk. Amino acid analysis of quarg samples indicated possible lowering of lysine content for the hydrolyzed quargs. AS

Whey

2668 Mann (S) and Thompkinson (DK). Immobilized Beta-galactosidase for lactose hydrolysis. Australian Journal of Dairy Technology 43(2); 1988; 47-49

Whey from buffalo milk cheese was fermented using Beta-galactosidase from Kluyveromyces fragillis. The enzymes were immobilized on suberlite resin (IRA-93). Conditions for optimization of lactose fermentation were standardized on a fluidized bed reactor (bench top model). JSS

Whey proteins

2669 Bertrand-Harb (C), Chobert (J-M) and Nicolas (M-G). Influence of mixing apparatus on whey protein emulsifying activity measurement. Sciences des Aliments 9(1); 1989; 195-202

The effect of a mixing apparatus (Polytron or Waring) on the emulsifying activity measurement of whey proteins and their trypsin hydrolysates, when two types of oil (soy or rapeseed) were used have been studied. When emulsions were realized with soybean oil for pH value of protein solution below 5.0, the emulsifying activity of whey proteins was higher when polytron was used, as compared to waring; for pH values above 5.0, the emulsifying activity of trypsin hydrolysates of whey proteins was higher when waring was used but the emulsifying activity of control whey proteins was higher when polytron was used. When emulsions were obtained with rapeseed oil, the emulsifying activity of control whey proteins was higher with Polytron than with Waring; for trypsin hydrolysates, the emulsifying activity was higher with polytron for acidic pH and with waring for basic pH. AS

Milk proteins

2670 Leman (J) and Kinsella (JE). Surface activity, film formation, and emulsifying properties of milk proteins. CRC Reviews in Food Science and Nutrition 28(2); 1989; 115-138

This review discusses possible relationships between the molecular structure, interfacial activity, and emulsifying properties of different milk proteins. Aspects covered are milk proteins (casein and whey proteins) interfacial behaviour and film formation by milk proteins, properties of protein films, emulsifying properties of milk proteins (methodology, caseins, whey proteins and Beta-lactoglobulin), effects of modification on emulsifying properties (chemical modification and enzymatic modification), emulsion stability and stability detn. (gravimetric method, temp./gravimetric method, optical methods/turbidimetry; measurement of the dielectric constant, pulsed NMR measurement, measurement of electrical conductivity, ultrasonic methods, droplet size and others). 145 references. BV

2671 Parris (N), Barford (RA), White (AE) and Mozersky (SM). Effect of processing temperature and storage time on non-fat dry milk proteins. Journal of Food Science 54(5); 1989; 1218-1221

Changes in physicochemical properties of pooled non-fat milk preheated to 63 C (I), 74 C (II), and 85 C (III), before spray-drying were examined. Insoluble material from III contained more protein (particularly at reduced pH) and more coagulated protein-lactose aggregates than either I or II. Soluble material from III was practically depleted of whey proteins which were utilized to form complexes stabilized through disulphide bonds. Milk protein micelles from III were heavier (ca 1×10^{11} g/mole) than either I or II. An unsweetened milk-orange juice blend, which was pasteurized at 63 C for 30 min and stored at 4 C, developed a precipitate which contained more protein and pectin, but less sucrose than the supernatant. AS

2672 Schwendig (P), Camps (G) and Thier (H-P). Isolation of agar, carrageenan and alginate from protein-containing foods. Zeitschrift fur Lebensmittel-Untersuchung und -Forschung 188(6); 1989; 545-546 (De)

In the analysis of thickeners and gums by methanolysis of capillary GLC, even agar, carrageenan and alginate can be separated from milk proteins in high yields. To do this, the general clean-up method reported previously is supplemented by an enzymatic proteolysis and a heating step prior to precipitation of residual proteins with sulphosalicylic acid. AS

MEAT AND POULTRY

2673 Jones (SDM). Future trends in red meat processing. An overview. Canadian Journal of Animal Science 69(1); 1989; 1-5

Review. 23 references. BV

Meat

2674 Alonge (DO). Carcinogenic polycyclic aromatic hydrocarbons (PAH) determined in Nigerian kundi (smoke-dried meat). Journal of the Science of Food and Agriculture 43(2); 1988; 167-172

Chemical analyses of kundi show that, apart from a high level of carcinogenic benzo(a)pyrene (10.5-66.9 ng g^{-1}), eight other polycyclic aromatic hydrocarbons (PAH) in kundi are due to the high glow and smoking temp. averaging 926 C and 191.5 C. resp. Column chromatography was used for PAH extraction with propylene carbonate as the eluting chemical; thin layer chromatography (TLC) on acetylated cellulose layer plates was used for separation, and the detn. was performed using spectrophotofluorimetry. The public health implication of PAH as one of the possible carcinogenic factors in the high incidence of primary liver and stomach cancer reported in Nigeria are highlighted. AS

2675 Gailani (MB) and Fung (DYC). Microbiology and water activity relationship in the processing and storage of Sudanese dry meat. Journal of Food Protection 52(1); 1989; 13-20

Microbiology and water activity relationships East African dry meat SHARMOOT has been studied. Traditional method of its preparation has been modified by an improved precooking and grinding procedure which is shelf stable for at least 4 months at ambient conditions. The data indicated that the product so prepared microbiologically more acceptable than traditional roduct. CTD

Beef

2676 Abu-Bakar (A), Reagan (JO), Carpenter (JA) and Miller (MF). Effect of added water, sodium erythrobate and storage time on the functional properties of prerigor beef preblends in a model system. Meat Science 25(3); 1989; 187-197

2677 Anderson (ML), Keeton (JT), Acuff (GR), Lucia (LM) and Vanderzant (C). Microbiological characteristics of precooked, vacuum packaged uncured beef and pork. Meat Science 25(1); 1989; 69-79

2678 Arganosa (GC) and Marriott (NG). Organic acids as tenderizers of collagen in restructured beef. Journal of Food Science 54(5); 1989; 1173-1176

2679 Cannell (LE), Savell (JW), Smith (SB), Cross (HR) and John (LCS). Fatty acid composition and caloric value of ground beef containing low levels of fat. Journal of Food Science 54(5); 1989; 1163-1168

2680 Kamoun (M) and Culioli (J). Influence of ageing on the mechanical properties of bovine cooked meat. Sciences des Aliments 9(1); 1989; 3-18

2681 Nortje (GL) and Shaw (BG). The effect of ageing treatment on the microbiology and storage characteristics in modified atmosphere packs containing 25% carbon dioxide plus 75% oxygen. Meat Science 25(1); 1989; 43-58

2682 Watanabe (A), Tsuneishi (E) and Takimoto (Y). Analysis of ATP and its breakdown products in beef by reversed-phase HPLC. Journal of Food Science 54(5); 1989; 1169-1172

Beef steaks

2683 Trout (GR). The effect of calcium carbonate and sodium alginate on the colour and bind strength of restructured beef steaks. Meat Science 26(3); 1989; 163-175

Mutton

Lambs

2684 Ahmed (PO), Miller (MF), Lyon (CE) and Reagan (JO). Chemical, textural and sensory characteristics of precooked, restructured lamb shoulder roasts as influenced by grinding method, salt level and vacuum massage time. Journal of Food Science 54(5); 1989; 1198-1201

The influence of level of grind (kidney plate only vs kidney plate plus coarse grinding 25% of raw meat wt.), salt level (0.5 vs 1.0%) and vacuum massage time (1.0 vs 1.5 h) on the chemical, textural and sensory characteristics of precooked, restructured lamb shoulder roasts were studied. Grinding method of kidney plate only decreased the fat content of the cooked product, while the higher salt level (SL) resulted in roasts with higher moisture and lower protein. Calories were reduced by 5% when 1.0% SL roasted were vacuum-massaged for 1.5 vs 1.0 h. Increasing level of grind and SL decreased cooking losses and increased objective chewiness. Flavour differences were detected by sensory analysis due to the addition of coarse ground trimmings to lean ground through a kidney plate only. AS

2685 Bray (AR), Graafhuis (AE) and Chrystall (BB). The cumulative effect of nutritional shearing and preslaughter washing stresses on the quality of lamb meat. Meat Science 25(1); 1989; 59-67

Carcass and meat characteristics were measured in lambs exposed to combinations of nutritional, shearing and preslaughter washing treatments. Both shearing and a low plane of nutrition reduced carcass wt. ($P < 0.001$) and increased carcass leanness ($P < 0.01$). Tenderness and colour of M. Longissimus dorsi were not significantly influenced by treatments even though there were substantial responses in meat pH. In lambs subjected to all three stressors pH was 0.40 units above control levels, significantly more than the sum of individual effects ($P < 0.05$), demonstrating a cumulative effect of stressors on meat pH. AS

Pork

2686 Buckley (DJ), Gray (JI), Asghar (A), Price (JF), Crackel (RL), Booren (AM), Pearson (AM) and Miller (ER). Effects of dietary antioxidants and oxidized oil on membranal lipid stability and pork product quality. Journal of Food Science 54(5); 1989; 1193-1197

2687 Todd (SL), Cunningham (FE), Claus (JR) and Schwenke (JR). Effect of dietary fiber on the texture and cooking characteristics of restructured pork. Journal of Food Science 54(5); 1989; 1190-1192

Pure cellulose (Solka-Floc), microcrystalline cellulose (Avicel) and a soluble gum (Nutriloid Fiberplus) were added to ground pork at 3.5% and 7.0% based on total dietary fiber content of each ingredient. Texture and cooking characteristics were determined on the patties from all treatments and compared to a control. The two cellulose products at 3.5% most closely resembled the control. The two cellulose products at 7.0% exhibited more hardness, whereas the gum products at 3.5% and 7.0% showed less springiness (elasticity). Cooking losses declined as fiber concn. increased from 3.5% to 7.0% for the cellulose products, but increased for the gum products. The Avicel products at 3.5% and 7.0% and Solka-Floc product at 7.0% exhibited significantly less change in diameter (patty shrinkage). AS

Products

Meat

2688 Johns (AM), Birkinshaw (LH) and Ledward (DA). Catalysts of lipid oxidation in meat products. Meat Science 25(3); 1989; 209-220

In emulsions consisting of refined lard, egg white and corn starch, haemoglobin, initially a mixture of the oxy and met forms, at levels similar to the haemoprotein contents found in fresh meat, was a far more powerful catalyst of lipid oxidation, as measured by TBA number, than inorganic iron compounds at levels appropriate to those found in meat. This was true over the pH range 4.5 to 7.5. When added and evenly distributed to exhaustively washed muscle fibres (WF), at levels appropriate to those found in meat, haemoglobin was again a powerful catalyst, but all forms of inorganic iron appeared to have little prooxidant activity. The rate of oxidation of the lipid was very dependent on the haemoprotein concn., being maximal in the range 10^{-4} to 10^{-5} M. This equates to an approx. unsaturated lipid to haem molar ratio of several hundred to one, similar to the values reported for model linoleate haem systems. In heated systems the haemoprotein again appeared to be a more effective catalyst than inorganic iron at levels appropriate to those found in meat. It is conluded that the conflicting results as to the roles of haem pigments and inorganic iron in lipid oxidation found in the literature are due, atleast in part, to the difficulty of evenly dispersing the catalysts in the washed fibres, especially if heat or freezing leads to subsequent phase separation, and that hydrogen peroxide formed by autoxidation of the oxy-pigments, may be necessary for ferric haem pigments to be effective catalysts. AS

2689 Rogov (JA), Kovalev (YI), Tokaev (ES) and Kaplan (MA). Iron absorption from meat and meat products. Part II. Iron absorption from high-roughage meat products. Meat Science 25(3); 1989; 227-236

The main reasons for the inhibiting effect of dietary fibre on meat Fe absorption in the intestine are examined. A model exp. estimates binding of Fe by the dietary fibre (DF) of wheat bran. A radioactive tracer method was applied to volunteers to detect the availability of iron from fibrous meat foods. The evidence suggests that incorporating up to 2% of dietary fibre into meat products reduces Fe absorption factors by no more than 1-2%. Adding ascorbic acid in the presence of DF lowers them only by 0.1-0.5% i.e. it does not damage iron absorption processes. AS

2690 Rogov (JA), Kovalev (YI), Tokaev (ES) and Kaplan (MA). Iron absorption from meat and meat products. Part I. Theoretical foundations for estimating available iron. Meat Science 25(3); 1989; 221-226

A theoretical foundation is developed to estimate available meat iron. Iron absorption factors are calculated for various kinds of raw meat. A methodology for estimating available iron from finished meat products, depending on the content of different meat ingredients, is suggested. AS

Ham

2691 Kuo (JC), Wang (Y), Peng (AC) and Ockerman (HW). Effect of tempeh on properties of ham. Journal of Food Science 54(5); 1989; 1186-1189, 1233

Hams made with meat plus tempeh (2% and 3.5%) had lower ($P < 0.05$) moisture and cooking yield; TBA value were slightly lqwer than the control after 30 days. Cooking yield of hams decreased with the increased amount of tempeh. Meat plus tempeh (2% and 3.5%) and ($P < 0.05$) lower Hunter L values and higher Hunter a values than the control. The control had higher shear force and binding strength values than those made with meat plus tempeh. Hams made with meat plus 2% tempeh and meat plus 3.5% tempeh were not significantly different from each other in overall acceptability scores but neither of these treatments was as acceptable as the control. AS

Sausages

2692 Skrede (G). Comparison of various types of starch when used in meat sausages. Meat Science 25(1)21-36;

Technological and sensory properties of meat sausages formulated with 4.0% of either potato flour, modified (acetylated distarch phosphate) potato starch, wheat, corn or tapioca starch were compared. Sausages were analyzed after cooking at temp. between 65 and 85 C followed by storage at 5 C and -25 C. Characteristics evaluated were wt. loss during cooking and storage, instrumentally and sensory assessed firmness, taste and smell of sausages. The results revealed differences in the suitability of starches for use in meat sausages. Part of the differences could be ascribed to differences in gelatination properties of the starches. With the criteria used for evaluating quality, potato flour was rated as the best suited starch followed by wheat starch while tapioca was rated as the least suited. Corn starch required cooking temp. above 75 C and showed relatively low freeze/thaw stability. The modified potato starch stored well both above and below the freezing point. AS

Poultry

Chickens

2693 Amato (PM), Hamann (DD), Ball (HRJr) and Allen Foegeding (E). Influence of poultry species, muscle groups, and NaCl level of strength, deformability, and water retention in heat-set muscle gels. Journal of Food Science 54(5); 1989; 1130-1149, 1157

The effects of poultry sp. (chicken and turkey) muscle groups (breast, thigh, and drum) and NaCl concn. (1% and 2%) on a low fat gel system were compared using measurements of shear stress (strength) shear strain (deformability), and two water retention measurements. Results showed doubling NaCl tended to double stress for all sp. and muscle groups and increased strain by 30-50%. Cross sp. differences showed higher stress in turkey gels than in chicken gels with 2% NaCl. For both sp. stress, strain and water retention were lowest in breast gels with both NaCl concn. and strain was greater in thigh gels than in drum gels with 2% NaCl. AS

2694 Martin (R), Wardale (RJ), Jones (SJ), Hernandex (PE) and Patterson (RLS). Production and characterization of monoclonal antibodies specific to chicken muscle soluble proteins. Meat Science 25(3); 1989; 199-207

Three stable hybridoma cell lines (AH4, BC9 and CF2) have been produced which secrete monoclonal antibodies specific for chicken and turkey muscle proteins. Partial characterization by ELISA and SDS-PAGE immunoblotting indicated that the antibodies failed to cross-react with similar extracts of pork, beef, lamb, horse or rabbit. One of the cell lines (AH4) secreted a monoclonal antibody that was also capable of distinguishing between chicken and turkey by indirect ELISA. AS

2695 Samejima (K), Kuwayama (K), Yamamoto (K), Asghar (A) and Yasui (T). Influence of reconstituted dark and light chicken muscle myosin filaments on the morphology and strength of heat-indiced gels. Journal of Food Science 54(5); 1989; 1158-1162, 1168

The morphological characteristics and heat-induced gel properties of filaments (reconstituted from dark and light chicken muscle myosin by dialysis (slow filamentogenesis) and dilution (fast filamentogenessis) methods were studied. The solubility/turbidity properties of myosin isolated from dark and light muscles were quite similar at different pH value and temp., but the morphological characteristics of reconstituted filaments of dark and light myosin varied markedly, depending upon whether they were fored by dialysis or dilution. AS

2696 Xiong (YL) and Brekke (CJ). Changes in protein solubility and gelation properties of chicken myofibrils during storage. Journal of Food Science 54(5); 1989; 1141-1146

The effect of storage on protein solubility and heat-induced gelation properties of chicken hen breast and leg myofibrils was investigated. Myofibrils suspended in 0.76M NaCl, pH 6.0, showed increasing protein solubility, viscosity, gel strength and water holding capacity with storage at 4 C. However, the effect of storage was most dramatic only during the initial 10 h for all of the parameters studied. The relative distribution of the proteins comprising the salt soluble protein (SSP) extract changed during storage. Although storage had little effect on breast SSP, it was deterimental to leg SSP gelation. Breast myofibril suspensions, for all storage times, contained a greater amount of SSP and had better gelation properties than leg myofibril suspensions. AS

2697 Young (LL) and Lyon (CE). Effect of muscle pH and calcium content on quality of pre- and postrigor chicken breast muscle. Journal of Food Science 54(5); 1989; 1155-1157

Effects of calcium chloride and [ethylene-bis (oxymethylene-nitrile)] tetraacetic acid (EGTA) marination at pH 5.0 and 7.5 on quality of pre- and postrigor chicken muscles were determined. Marinade absorption was lower and shear resistance was higher for prerigor compared with postrigor muscles at both pH levels. Shear reistance of EGTA-pH 5.0 treated prerigor muscles was greater than those of all other prerigor muscles but that of EGTA-pH 7.5 treated prerigor muscles was similar to that of the controls. Ca content and pH were related factors affecting muscle quality. AS

Broilers

2698 Ang (CYW) and Young (LL). Factors relating to oxidative stability of cooked broiler breast patties treated with sodium tripolyphosphate. Journal of Food Science 54(5); 1989; 1151-1154

Broiler breast meat patties were prepared with 0, 0.2 and 0.5% sodium tripolyphosphate (STPP) at 3 pH values and 3 ionic strengths (IOS). The concn. of STPP and IOS were important factors in retardation of oxidation during cooking and storage after cooking as evaluated by the thiobarbituric acid-reactive substances (TBA-RS) test. The effect of STPP at 0.5% was enhanced ($P < 0.06$) by raising its pH to 7.5 or 9. Increasing IOS by 0.6 raised TBA-RS values in raw meat and during cooking, but it had a reverse effect on cooked stored patties, which was probably due to the lower nonheme iron content of cooked patties as the IOS increased. AS

2699 Hartfiel (W) and Sagredos (A). Examination of various residues from the industrial fatty acid production on broilers. FAT Science and Technology 91(4); 1989; 154-158 (De).

Residue from fish, rapeseed, soya oil, tallow and stearin, obtained during the production of industrial fatty acids, have been fed to broilers to see their suitability as poultry feed. Feed take up, increase in wt., and feed exploilation were the basic criteria for the feeding trials. Study on the toxicological aspects could not be completed. N

Turkeys

2700 Ernst (EA), Ensor (SA), Sofos (JN) and Schmidt (GR). Shelf-life of algin/calcium restructured turkey products held under aerobic and anaerobic conditions. Journal of Food Science 54(5); 1989; 1147-1150, 1154

The shelf-life of restructured products made with ground turkey or turkey breast pieces and formulated with combinations of 0.5-1.0% sodium alginate, 0.1-0.2% calcium carbonate and 0.15-0624% lactate (ACL) was compared to product containing a combination of 1.4% NaCl and 0.32% sodium tripolyphosphate and to no-additive controls stored at 4 C under aerobic and anaerobic conditions. No significant ($P < 0.05$) differences were observed between ACL and salt/phosphate restructured turkey products in the rate and extent of growth of psychrotrophs or lactic acid bacteria. The salt/phosphate combinations, however, repressed ($P < 0.05$) the growth of pseudomonads. Overall, inclusion of ACL did not influence spoilage of restructured turkey meat products held under aerobic or anaerobic conditions. AS

Poultry products

Eggs

2701 Pandey (NK), Pand (B), Maitra (DN) and Mahapatra (CM). The influence of strain, age and season on cholesterol, vitamin A and fatty acid contents of egg. Journal of Food Science and Technology, India 26(3); 1989; 161-163

Changes in cholesterol, vitamin A and fatty acid content of egg due to strain and age of birds and season of the yr were investigated. Control had higher egg wt. and contained more Cholesterol and vitamin A than the selected strains. Cholesterol level in the egg decreased while vitamin A content increased with increase in age of hens and advancement of season from winter through fall. Of all the fatty acids studied, only stearic acid varied among strains. Oleic acid content was higher in pullet eggs whereas linoleic acid increased continuously with age. Winter eggs had more oleic and arachidic acids and less palmitoleic and linoleic acids than summer and fall eggs. AS

Egg products

2702 Steffens (K) and Maier (T). Determination of endotoxin in egg products with a miniaturized chromogenic Limulus test. Zeitschrift fur Lebensmittel-Untersuchung und -Forschung 188(6); 1988; 531-534 (De).

A chromogenic Limulus amoebocyte lysate assay was applied to monitor endotoxin concn. in egg products. Analysis of differently contaminated whole egg probes revealed a strong correlation of endotoxin concn. to total bacterial count 6 x 10^4 cfu x ng^{-1} , where cfu=colony-forming unit) as well as to number of Enterobacteriaceae (1 ng/7 x 10^2 cfu). Similar relations were also found for egg white and egg yolk probes. A significant influence of heat pretreatment of egg probes (65 C, 60 min) on endotoxin detection could be excluded. Up to a concn. of 10 mg x ml^{-1} endotoxin-free whole egg material did not interfere with the test system. A miniaturized version of the chromogenic Limulus test, which can be carried out in microtiter plates, is described. AS

Egg white

2703 Hsieh (YL) and Regenstein (JM). Texture changes on heating spray-dried egg white. Journal of Food Science 54(5); 1989; 1206-1208

Computerized texture profile analysis and a computer-simulated model of protein monomer complexation were used to study egg white gelation. The results showed that the parameter K_n , an association equilibrium constant, was large so that the monomer to monomer complex reaction essentially went to completion. Approx. 8 to 10 protein monomer units combined to form the egg white gel. The monomer complex primarily contributed to the hardness of egg white. AS

2704 Kitabatake (N), Shimizu (A) and Doi (E). Comparison of transparent gels with turbid gels prepared from egg white. Creep analysis of gels. Journal of Food Science 54(5); 1989; 1209-1212

Egg white from which the precipitate occurring, during dialysis against water had been removed gave a transparent gel on heating at lower salt concn. and pH 3.54. The addition of NaCl or a shift of pH from 3.54 to 4.50 brought about the turbid gels. Creep analysis of these transparent and turbid gels were done using a four-element mechanical model. The instantaneous elastic modulus E_0 , Newtonian modulus, Eta_N , and retarded viscoelastic moduli, E_1 and Eta_1 increased with NaCl up to 125 mM and the decreased with increase in NaCl concn. at pH 3.54. At 125 mM NaCl and pH 3.54, a translucent gel was obtained. E_0 and Eta_N decreased with temp. of the gel, while E_1 and Eta_1 did not change depending of temp. AS

SEAFOODS

Prawns

2705 Papadopoulos (LS), Smith (SB), Wheeler (TL) and Finne (G). Muscle ultrastructural changes in fresh water prawns, Macrobrachium rosenbergii during iced storage. Journal of Food Science 54(5); 1989; 1125-1128, 1157

Deheaded and whole prawns (Macrobrachium rosenbergii) were stored up to 10 days on ice. Myofibrils, extracted from the first abdominal segment, were prepared for incubations at different ionic strengths (0.1 to 0.3 M) and subsequent SDS-gel electrophoresis, while other samples were prepared intact for transmission electron microscopy. Elevated ionic strengths in vitro increased the solubilization of specific myofibrillar proteins (such as myosin heavy chain); this effect was especially pronounced in prawns stored whole. Proteolysis was indicated in samples from whole prawns by the appearance of a family of proteins ranging in mol. wt. from 65 KD to 180 KD. Loss of myofibrillar integrity was apparent by day 10, with losses more pronounced in whole prawns than in deheaded prawns. AS

Fish

2706 Haaland (H) and Njaa (LR). Ammonia and total volatile nitrogen in preserved and unpreserved stored, whole fish. Journal of the Science of Food and Agriculture 44(4); 1988; 335-342

Total volatile nitrogen (TVN), ammonia and amide-N were analysed in fish stored with and without preservatives. In well preserved fish the increase in ammonia-N during storage was accompained by a parallel decrease in amide-N. It is concluded that ammonia may originate from glutamine and probably also from asparagine. In unpreserved material other sources may dominate. AS

2707 Nieto (MB) and Toledo (RT). Fate of Clostridium sporogenes PA 3679 in fish sausage formulation with adjusted water activity using food binders. Journal of Food Science 54(5); 1989; 1129-1132, 1135

Fish sausage from minced Spanish mackerel was formulated to water activity of 097-0.92 using egg white solids alone and in combination with nonfat dry milk, alginate and soy protein isolate, without and with nitrite added at 150 p.p.m. The batter was inoculated with PA 3679 spores at Ca. 10^5 g, chopped, stuffed in casing, cooked to a core temp. of 85 C, vacuum-packaged and stored at 25 C for 60 days. The test organism did not reproduce in formulations having water activity < 0.95. Total counts decreased rapidly and spore counts were nil at the end of storage. Spores of PA 3679 germinated at water activity as low as 0.924 but the cells failed to grow. Products with water activity > 0.95 spoiled. Product stability was influenced by water activity regardless of binder type and presence of nitrite. AS

2708 Nirmal Thampuran and Mahadeva Iyer (K). A note on the distribution of Alteromonas putrefaciens in marine fishes landed at Cochin. Journal of Food Science and Technology, India. 26(3); 1989; 166-168

The study reveals that Alteromonas putrefaciens forms 0.11 to 3.28% of the total plate count (TPC) on fish and 0.88 to 31.6% of the total hydrogen sulphide producers. There was no correlation between TPC and count of hydrogen sulphide producers A. putrefaciens. The study, shows that the prevalence of A. putrefaciens is quite low in freshly landed fish. Important biochemical characteristics useful for identification of this sp. are also reported. AS

2709 Scobbie (AE) and Mackie (IM). The use of sodium dodecyl sulphate polyacrylamide gel eletrophoresis in fish species identification. A procedure suitable for cooked and raw fish. Journal of the Science of Food and Agriculture 44(4); 1988; 343-351

A procedure for the identification of the sp. of fish from the separation patterns obtained on SDS polyacrylamide gel electrophoresis is described. Extracts of either raw or cooked flesh in SDS solution were subjected to electrophoresis in a 12.5% SDS polyacrylamide slab gel system, and the separation patterns obtained on silver staining were shown to be sp. specific. Heating prior to extraction in SDS had little effect on the separation patterns obtained for a range of commercially important sp. This procedure offers advantages over other methods available for the identification of the sp. of cooked fish. AS

Alaska Pollack

2710 Krueger (DJ) and Fennema (OR). Effect of chemical additives on toughening of fillets of frozen Alaska Pollack (Theragra chalcogramma). Journal of Food Science 54(5); 1989; 1101-1106

Fillets of Alaska pollack (Theraga chalcogramma), a gadoid, were treated with solutions of citrate, sodium pyruvate, or hydrogen peroxide frozen and stored for 9 wk at -10 C . Protein extractability, texture, cooked moisture content, and activity of trimethylamine oxide demethylase were monitored during storage. None of the treatments slowed normal decline in protein extractability during frozen storage, however, sodium citrate and hydrogen peroxide significantly ($P < 0.1$) inhibited development dimethylamine (DMA). This inhibition of DMA development did not, however appear to be associated with a decrease in the rate of toughnening evidenced in hydrogen peroxide treated fillets. Sodium citrate and sodium pyruvate significantly slowedrate of toughening during storage, and this effect may be related to their positive effect on water-holding capacity. AS

Carp

2711 Gelman (A) and Benjamin (E). Characteristics of mince from pond-bread silvercarp (Hypophthalmichthys molitrix) and preliminary experiments on its use in sausages. Journal of the Science of Food and Agriculture 47(2); 1989; 225-241

2712 Steffens (W), Lieder (U), Mieth (G), Friedrich (M) and Wirth (M). Nutritional aspect of silver and marble carp with special reference to their lipid content. Ernahrungsforschung 34(12); 1989; 41-44 (De).

Silver carp (Hypophthalmichtys molitrix) and marble carp (Aristichthys nobilis) are cyprinid sp. which are expected to bring a growing yield in the GDR in the next few years (1990: 1300t). The fishes are reared in ponds, utilize plankton and do not need any additional feeding after release in lakes. The edible portion of fish wt. between one and four kg amounts to 44-47% the average lipid content is 17%. The fatty acid composition is characterized by a considerable amount of polyunsaturated fatty acids (PUFA). The essential polyenoic acid index (Sigman - 3/Sigman - 6) is 2,0. 12% of the total fatty acids come to eicosapentaenoic acid (C 20: 5 n - 3) and docosahexaenoic acid (C 22: 6n-3). Therefore, silver and marble carp are highly valuable foods which are also suitable for dietetic purposes. AS

Cod

2713 Simard (RE) and Villemure (G). Detection of pathogenic bacteria in Atlantic cod under carbon dioxide atmosphere. Sciences des Aliments 9(1); 1989; 155-160

Atlantic cod was stored under 25% carbon dioxide; 75% N at 0, 4, 10, and 22 C during 16 days and was tested for the presence of four different pathogenic bacteria: Clostridium botulinum, Cl. perfringens, Yersinia enterocolitica and Campylobacter jejuni. At 0, 4, 10 C no pathogenic bacteria except Y. enterocolitica was detected at any of the temp. and time regimes tested. In one occasion Cl. botulinum was detected at 22 C from day 4 to 16. In spite of the presence of Y. enterocolitica on fish, storage of cod under carbon dioxide atm. is considered relatively safe when no abuse of temp. occured during storage. AS

Mackerels

2714 Alur (MD), Venugopal (V) and Nerkar (DP). Spoilage potential of some contaminant bacteria isolated from Indian mackerel (Rastrelliger kanagurta). Journal of Food Science 54(5); 1989; 1111-1115

Pseudomonas marinoglutinosa, Aeromonas hydrophila isolated from unirradiated spoiling Indian mackerel (Rastrelliger kanagurta) and Bacillus megaterium, Micrococcus colpogenes isolated from gamma-irradiated mackerel were examined for their spoilage potential in fish homogenate and fish muscle sarcoplasmic and myofibrillar protein fractions. Pseudomonas marinoglutinosa (0 -2), Aeromonas hydrophila (0-2 C) and Bacillus megaterium (26 C) proliferated in the fish homogenate and sarcoplasmic protein fraction which was associated with losses in sensory attributes and increase in non-protein nitrogen (NPN) compounds, total volatile acids (TVA) and total volatile basic nitrogen (TVBN) compounds. On the other hand, the organisms exhibited diminished growth in MF fraction which was also accompanied by less changes in sensory and chemical quality parameters. Growth of M. colpogenes was not accompanied by putrefaction of the fish media as assessed by sensory and chemical criteria, suggesting contribution of varying spoilage potentials of the bacterial isolates in the overall spoilage of the fish. AS

Menhaden

2715 Hwang (FKT) and Regenstein (JM). Protection of Menhaden mince lipids from rancidity during frozen storage. Journal of Food Science 54(5);

1989; 1120-1124

Several antioxidants as well as vacuum packaging and changes in frozen storage temp. (-7 C and -20 C) were tested for their effect on the peroxide values and free fatty acids (FFA) of frozen minces from Gulf Menhaden, Brevoortia patronus and Atlantic Menhaden, Brevoortia tyrannus, Vacuum packaging was the most effective in retarding oxidative rancidity. Storage at -20 C also reduced the oxidation versus -7 C. Ascorbic acid and erythorbic acid had the best antioxidant activity of the additives tested. Tocopherols, rosemary extracts, and tertiary butylhydroquinone (TBHO) had limited antioxidant activity. Storage at -20 C inhibited hydrolytic rancidity. Neither vacuum packaging nor any of the additives prevented FFA development at -7 C. AS

Mullets

2716 El-Sebaiy (LA), Metwalli (SM) and Khalil (ME). Phospholipid changes in muscles of plathead grey mullet (Mugil cephalus) during frozen storage. Food Chemistry 26(2); 1987; 85-96

Scallop

2717 Yamanaka (H). Changes in polyamines and amino acids in scallop adductor muscle during storage. Journal of Food Science 54(5); 1989; 1133-1135

Changes in polyamines and amino acids were followed in scallop adductor muscle during storage at 5 C and 15 C. Agmatine, putrescine and cadaverine increased markedly as decomposition progressed. Arginine decreased noticeably during storage and was partly converted into ornithine and agmatine. Putrescine and ornithine were detected at levels of 0.5 to 0.7 mg/100g and 3.2 to 4.6 mg/100g, resp., in the initial stage of decomposition and exceeded 2.2 and 15.0 mg/100g, resp., at the advanced stage of decomposition regardless of the storage temp. Putrescine and ornithine appeared to be useful as potential indicators for freshness of scallop adductor muscle. AS

Shark

2718 Ghosh (S). A simple technique to remove urea from shark (Carcharhinus sp.). Journal of Food Science and Technology, India 26(3); 1989; 164-165

Urea content of shark muscle is mainly responsible for its unacceptability for human consumption as its slow degradation by bacterial action results in persistent ammoniacal odour. The urea in shark muscle could be rapidly eliminated by mixing the minced muscle with unroasted soy flour which contains urease. A 10% concn. of unroasted soy flour could eliminate the urea in shark muscle within 5.5 h. AS

Whitings

2719 Chang-Lee (MV), Pacheco-Aguilar (R), Crawford (DL) and Lampila (LE). Proteolytic activity of surimi from Pacific whiting (Merluccius products) and heat-set gel texture. Journal of Food Science 54(5); 1989; 1116-1119, 1124

The protease activity in mechanically deboned Pacific whiting flesh was reduced to 56.3% by two water minced 3:1 (wt:wt) flesh wash exchanges and refining. Surimi (91.7% refined flesh, 4.0% sorbitol, 4.0% sucrose, and 0.3% condensed phosphate) produced very poor gels but the strength was markedly improved by the addition of egg white. Hardness increased 1.5 fold and elasticity 4.5 fold over the control with the addition of 3.0% egg white. Further improvement in gel strength was observed with the addition of 5.0% potato starch in combination with egg white. Sodium dodecyl sulphate polyacrilamide gel electrophoresis (SDS-PAGE) of heat-set gels verified the action of inhibitors in egg white on residual proteases contained in whiting surimi. AS

PROTEIN FOODS

Infant foods

2720 Galdi (M), Carbone (N) and Valencia (ME). Comparison of ferric glycinate to ferrous sulphate in model infant formulas. Kinetics of TBA, lysine and methionine changes. Journal of Food Science 54(5); 1989; 1230-1233

Ferric glycinate prooxidant properties were compared with those of ferrous sulphate in a powdered casein-based infant formula. About 60 p.p.m. of either source were added to experimental formulas, and supplemented formulas stored at 20, 37 or 45 C for 7-12 months. The samples were assayed periodically during storage for methionine and available lysine losses, and malonaldehyde formation. Deterioration rate constants for the ferric glycinate-fortified formula ropped to 60-75% of those for the ferrous sulphate-fortified formula. Activation energy values obtained for the glycinate iron source were 15-20% higher than those for ferrous sulphate. Thus, iron had lower prooxidative properties when added to this infant formula as ferric glycinate than when present as ferrous sulphate. AS

2721 Sarwar (G), Botting (HG) and Peace (RW). Amino acid rating method for evaluating protein adequacy of infant formulas. Journal of the Association of Official Analytical Society. 72(4); 1989; 622-626

2722 Weber (K), Schulte (E) and Thier (H-P). Comparison between the triglyceride patterns of human milk and infant milk formulae. FAT Science and Technology 91(3); 1989; 113-115 (De).

Human milk contains less triglycerides with saturated fatty acids than the three infant milk formulae analysed but has a higher content of triglycerides with two unsaturated fatty acids. The patterns of the major triglycerides are compared. In human milk, palmitic acid is preferably located in position 2 favourable to digestability, whereas in the infant milk formulae it is mostly distributed over positions 1 and 3. AS

ALCOHOLIC AND NON-ALCOHOLIC BEVERAGES

Alcoholic beverages

Beer

Breweries

2723 Schulz (R) and Beubler (A). International status of the application of genetically manipulated yeasts in the brewing industry. Lebensmittelindustrie 36(2); 1989; 62-65 (De).

Wort

2724 Hempel (J), Behnke (U), Rudloff (P) and Woler (HC). Examinations about the increase of the contents of Alpha-nitrogen in the wort. Lebensmittelindustrie 36(2); 1989; 66-69

Increased raw barley level in mash bills reduces alpha-amino nitrogen contents of wort. Reasons are discussed and influence of barley and malt inhibitors on "Brauereienzym" serine proteinases is proved. Use of non inhibitable neutral proteinase, recycling of hydrothermally treated brewers' yeasts, and lowering of pH increased alpha-AN levels. Conditions for brewers' yeast treatment and favourable application of separated yeast supernatant are investigated. Results are analyzed statistically. Conculsions are drawn for practice. AS

Wines

2725 Ajlec (R) and Stupar (J). Determination of iron species in wine by ion-exchange chromatography-flame atomic absorption spectrometry. Analyst 114(2); 1989; 137-142

2726 Bertrand (A) and Soufleros (E). Determination of free and total fatty acids of wine. Sciences des Aliments 9(1); 1989; 169-177 (Fr)

2727 Enkelmann (R). Migration of heavy metals of wine. Part 3. Calcium carbonate. Deutsche Lebensmittel-Rundschau 85(7); 1989; 216-220

Eight commercial calcium carbonates for the deacidification of must and wine were investigated on their content of Cu, Zn, Fe, Mg, Cr, Ni, Pb, Cd, arsenic and Al, using 20% nitric acid. The calcium carbonates were also dissolved in 1% tartaric acid in order to determine in the clear solution above the calcium tartrate precipitate the content of Fe, Mn and Al which were present in increased traces. The increase of the trace metals in wine expected, caused by deacidification with 67 g/h calcium carbonate was calculated. In most cases, the increase is unusually small. The increase in the wine caused by Fe, Mn and Al are also negligible. AS

2728 Etievant (PX), Issanchou (SN), Marie (S), Ducruet (V) and Flanzy (C). Sensory impact of volatile phenols on red wine aroma. Influence of carbonic maceration and time of storage. Sciences des Aliments 9(1); 1989; 19-33

2729 Henry Blade (W) and Boulton (R). Adsorption of protein by bentonite in a model wine solution. American Journal of Enology and Viticulture 39(3); 1988; 193-199

The adsorption of bovine serum albumin by bentonite in model wine solutions was studied. The attainment of equilibrium was found to be rapid and complete within 30 seconds of the addition. The extent of adsorption was characterized using both the Langmuir and Freundlich equations. The constants and the goodness of fit were determined by linear regression of the transformed equations. The adsorption was independent of temp. but varied with protein content, pH, and ethanol content. A comparison of various types of bentonite showed that calcium bentonites had lower adsorptive capacities, even though their measured cation exchange capacities were similar. AS

2730 Moutounet (M), Rabier (P), Puech (J-L), Verette (E) and Barillere (J-M). Analysis by HPLC of extractable substances in oak wood application to a Chardonnay wine. Sciences des Aliments 9(1); 1989; 35-51

2731 Oszmianski (J), Ramos (T) and Bourzeix (M). Fractionation of phenolic compounds in red wine. American Journal of Enology and Viticulture 39(3); 1988; 259-262

A simple analytical method was developed for the fractionation of phenolic compounds of red wine into phenolic acids (Fraction I), catechins, procyanidins, and anthocyanin monomers (Fraction II), flavonols (Fraction III), and anthocyanin polymers (Fraction IV) by passing wine through a preconditioned C_{18} Sep-pak cartridge and eluting sequentially with methanol, 16% acetonitrile at pH 2.0, ethyl acetate, and methanol. Each fraction was then injected onto a C_{18} HPLC column using a gradient of 3% to 100% acetonitrile in water at pH 2.6. This fractionation technique is the first step of quantitative analysis of total compounds in every fraction by a simple and rapid method; Spectrophotometry. AS

2732 Piton (F), Charpentier (M) and Troton (D). Cell wall and lipid changes in Saccharomyces cerevisiae during aging of Champagne wine. American Journal of Enology and Viticulture 39(3); 1988; 221-226

Ultrastructural changes of yeasts during aging of wine as demonstrated by thin-section electron microscopy demonstrated two principal modifications that could affect product quality. (1) Before six months, the transformation of cell walls began by the disappearance of the internal layer, even when cells were plasmolyzed. Between eight and 11 yrs, the mannans of external layers were in turn attacked, leaving a matrix without any affinity for silver by Thiery's reaction, which specifically visualizes polysaccharides. (2) Within six wks after bottling, a metabolic shift led to large expanding vesicles, which were the only persisting structures inside membrane strips. This was still the case after 15 yrs. Analysis of yeast lipids showed that such vesicles progressively accumulated neutral lipids, while polar lipid content strongly decreased. AS

2733 Vyas (KK), Sharma (RC) and Joshi (VK). Application of osmotic technique in plum wine fermentation. Effect on physico-chemical and sensory qualities. Journal of Food Science and Technology, India 26(3); 1989; 126-128

Osmotic treatment of plum fruits for wine fermentation was evaluated. Lye and water blanching as pre-treatments followed by osmosis were found to be quite effective in increasing the total soluble solids and decreasing the acidity of the fruits. But the treatments also resulted in some loss of anthocyanin and mineral contents. There were not much differences in rates of fermentation and the alcoholic contents of the wines. Compared to the untreated fruits, wines of acceptable acidities were produced from the musts of the pre-treated fruits. There was considerable improvement in various sensory quality attributes of wine obtained from the fruits pre-treated with water blanching followed by osmosis as compared to other treatments. AS

Non-alcoholic beverages

2734 Galasko (GTF), Furman (KI) and Alberts (E). The caffeine contents of non-alcoholic beverages. Food and Chemical Toxicology 27(1); 1989; 49-51

The caffeine content of a number of non-alcoholic beverages was determined using HPLC. It was found that Diet Coke had a greater caffeine content than Coke (4.15 compared with 3.13 mg/fl oz). Tab is virtually caffeine free, and Lucozade, sold as a tonic, contains more caffeine than any of the other carbonated beverages tested (5.17 mg/fl oz). The pure instant coffee tested contained much more caffeine than the coffee/chicory mixtures (12.61 compared with 3.18 mg/fl oz). The caffeine content of Ceylon tea blends increases with the time the tea is allowed to draw (from about 8 mg/fl oz after 1 min to about 12 mg/fl oz after 20 min). Tea that has been allowed to draw for 20 min has a caffeine content similar to that of pure coffee. AS

2735 Ibiyemi (SA), Abiodun (A), Ewaba (JO) and Akanji (SA). Nutrition in non-alcoholic beverages in Nigeria. Food Chemistry 26(1); 1987; 11-21

Coffee

2736 Ramirez-Martinez (JR). Phenolic compounds in coffe pulp. Quantitative determination by HPLC. Journal of the Science of Food and Agriculture 43(2); 1988; 135-144

This paper presents the results of the analysis of separation and quantitative detn. of some phenolic compounds present in fresh coffee pulp of 12 cvs grown either commercially or experimentally in the Andes region of vereznela by HPLC. The results showed that the average composition in the 12 cvs studied was found to be as follows. (1) chlorogenic acid -42.2 % (2) epicatechin -21.6%, (3) Isochlorogenic acid I-5.7%, (4) Isochlorogenic acid II -19.3%, (5) Isochlorogenic acid III-5.7%, (6) Catechin -2.2% (7) rutin -2.1%, (8) Protocatechnic acid -1.6% (9) Ferulic acid 1.0%. It was also found that when the percentages of chlorogenic and isochlorogenic acids are added to the corresponding one of epicatechin for each var. they make up between 92% and 98.4% of the total of identified phenolic compounds. There were not qualitative or quantixative differences found between var. resistant or susceptible to coffee leaf rust. NGKR

Fruit juices

Orange juices

2737 Mesallam (AS). Heavy metal content of canned orange juice as determined by direct current plasma atomic emission spectrophotometry (DCPAES). Food Chemistry 26(1); 1987; 47-58

The heavy metal content of canned orange juice as affected by container were determined and the compliance of the product with the Egyptian and international recommendation was assessed. It was concluded that cans caused higher metallic contamination than packing in paperboard or laminate pouches. It was therefore recomended to expand the use of non-tin containers for packaging orange juice. BV

Tea

2738 Owuor (PO) and Langat (JKA). Changes in chemical composition of black tea due to pruning. Tropical Science 28(2); 1988; 127-132

The changes in chemical comp. of black tea due to pruning have been investigated. It was seen that the length of time affected both chemical comp. and tasters evaluation of black tea from clone S15/10 tea. Theaflavins, caffeine, group II volatile flavour compounds (VFC), flavour index and tasters evaluation improved with increasing time whereas thearubigins, and group I VFC decreased. The implications of these results have been discussed. NGKR

2739 Steinhaus (B) and Engelhardt (UH). Theaflavins in black tea. Comparison of the flavognost and HPLC analysis-preliminary results. Zeitschrift fur Lebensmittel-Untersuchung und -Forschung 188(6); 1989; 509-511

The flavognost method and an isocratic reversed-phase HPLC method were compared in determining the theaflavins of black tea. A diode-array-detector was used. The flavognost method is a rapid procedure producing good reproducible results. Using the HPLC method, which is much more time consuming due to the necessity of a pre-separation by gel chromatography, one can determine four different theaflavins (theaflavin, theaflavin-3 gallate, theaflavin 3'-gallate and theaflavin 3, 3'-digallate) and their relative amounts. The differences between the results from these two methods normally increases with increasing theaflavin content. In most cases, the value of the flavognost method were considerably higher. Relative amounts of theaflavins are different in teas from different origins, especially those of theaflavin and theaflavin 3, 3'-digallate. AS

FATS AND OILS

2740 Nichols (BW). Processed oil and fat products. Food Chemistry 33(1); 1989; 27-31

In principle, the oil processers can produce a var. of fats and oils which would probably fulfill most definitions of natural. Similarly, it is possible to make products such as margarines and spreads using only natural ingredients and which could even be additive free. However, it would be difficult to justify from the viewpoint of general food quality, the universal adoption of natural processes and additive-free products, especially in terms of wholesomeness and good nutrition. AS

Fats

2741 Anon. Mutagenicity of repeatedly used cooking fats. Food and Chemical Toxicology 26(8); 1988; 740-741

2742 Lane (RH) and Phillips (JG). Toluene substitution for benzene as part of titration medium in fat acidity analysis. Collaborative study. Journal of the Association of Official Analytical Chemist's 72(4); 1989; 688-689

Substitution of toluene for benzene as part of the titration medium specified in the AOAC method for fat acidity (14.069-14.071) was evaluated by 3 lab. Blind duplicate samples of 5 commercially available flours were extracted with petroleum ether. The extracts were evaporated to dryness and dissolved in the titration medium containing equal vol. of 95% alcohol and benzene or toluene. Samples were then titrated with standard KOH to the end point of phenolphthalein. The data obtained showed no difference ($P > 0.05$) between the 2 solvents with respect to fat acidity means. The range of values for repeatability and reproducibility for both solvents was similar. These data indicate that toluene may replace the more toxic benzene. This change has been adopted as a revision in method 14.069-14.071. AS

Fatty acids

2743 Graham (SA). Cuphea. A new plant source of medium-chain fatty acids. CRC Critical Reviews in Food Science and Nutrition 28(2); 1989; 139-173

Review. 158 references. BV

Oils

2744 Dakovic (S), Turkulov (J) and Dimic (E). The quality of vegetable oils got by extraction with carbon dioxide. FAT Science and Technology 91(3); 1989; 116-119

This paper contains the results of the investigation of oils got by extraction with supercritical carbon dioxide. The extraction was done on a Nova-Swiss pilot plant. The following oils were investigated; soybean, sunflower and rapeseed oils. The results were compared with the liquid hexane extraction results. AS

Jojoba oils

2745 Shani (A). Heavily brominated and highly unsaturated derivatives of jojoba oil. Journal of the American Oil Chemists" Society 65(8); 1988; 1318-1323

Two hexabromojojoba isomers were prepared by bromine addition to bromo-olefinic and bromoallylic derivatives, and an octabromojojoba derivative was prepared from jojobatetraene. Bis-allylic bromination of jojoba wax or monoallylic bromination of jojobatetraene, both followed by HBr elimination, yielded jojobahexaene, which has two conjugated triene units on both parts of the ester. Bromine addition to jojohexane yielded dodecabromojojoba, which was unstable toward hydrolysis in water-decalin mixture at 120 C. This is in contrast to the relative stability of the octabromojojoba under these conditions. AS

2746 Verschuren (PM). Evaluation of jojoba oil as a low-energy fat. 1. A 4-week feeding study in rats. Food and Chemical Toxicology 27(1); 1989; 35-44

The nutritional properties of jojoba oil (JO) were examined in a 4-wk feeding study of rats fed a diet with JO at dose levels of 2.2, 4.5 and 9%, supplemented with a conventional fat up to 18%. General health, survival and food intake were not adversely affected. Body-wt. gains showed a dose-related decline, which amounted to 20% of the body wt. in the high-dose group of both sexes. Clinical chemistry revealed significantly increased levels of various enzymes that were indicative of cell

2747 Verschuren (PM) and Nugteren (DH). Evaluation of jojoba oil as a low-energy fat. 2. Intestinal transit time, stomach emptying and digestibility in short-term feeding studies in rats. Food and Chemical Toxicology 27(1); 1989; 45-48

The influence of jojoba oil (JO) incorporation in the diet on stomach emptying and intestinal transit time, and the digestion and absorption of JO were investigated in short-term feeding studies in rats. The animals were fed purified diets containing 18% (w/w) fat, of which half consisted of a mixture of lard and sunflower seed oil (SF) supplemented with an equivalent amount of JO. The control animals were fed a mixture of lard and SF(18%). No treatment-related differences were observed in the rate of stomach emptying or the intestinal transit time. Comparative lipid analysis of lymph, intestinal content, intestinal mucosa and faeces indicated that most of the ingested JO was degraed and absorbed. Part of the JO was present as wax ester in the lymph. Hydrolysis of JO was much slower than that of triacylglycerols and continued in the alimentary tract beyond the small intestine due to bacterial processes. JO did not influence the absorption of the conventional fat. AS

Neem oils

2748 Rukmini (C). Chemical and nutritional evaluation of neem oil. Food Chemistry 26(2); 1987; 119-124

Soybean oils

2749 Miller (LA) and White (PJ), High-temperature stabilities of low-linolenate, high stearate and common soybean oils. Journal of the American Oil Chemists" Society 65(8); 1988; 1324-1327

Four soybean oils (SBO) with different fatty acids (FA) comp. were tested for stability during intermittent heating and frying of bread cubes. None of the oils was hydrogenated or contained any additives. Two of the oils were from common commercial var. The other two oils were from seed developed in a mutation breeding program and included the line A5, which contained 3.5% linolenate, and the line A6, which contained 20% stearate. Each oil (450 g) was heated to 185 C in a minifryer. Bread cubes were fried at the beginning of heating, and half were stored at -10 C to preserve freshness. The second half was stored at 60 C for 14 days. Heating was continued for 10 h/day for four days. After 40 h of heating, and additional 30 g of bread cubes were fried. According to sensory evaluations of the fried bread cubes, peroxide values of oil extracted from the cubes and conjugated diene values of the oils, the A5 and A6 oils were more stable than those from the commercial var. all differences occurred in the flavour and oxidative stability of the cubes fried after 40 h of heating the oils. Large differences between A5 and A6 and the commercial var. occurred after storage of bread cubes for 14 days. AS

2750 Miller (LA) and White (PJ). Oxidative stabilities of low-linolenate, high-stearate and common soybean oils. Journal of the American Oil Chemists" Society 65(8); 1988; 1334-1338

It is generally aged that the high linplenate (18:3) content of soybean oil (SBO) contributes to its flavour instability. In this study, the oxidative stability of five SBO by various fatty acid (FA) comp. was compared by using peroxide values, conjugated dienoic acid values and sensory panel scores. Three of the oils were from common commercial var. representing the range of 18:3 content normally found in SBO. The other two oils were from seed developed in a mutation breeding program. One of these oils from the line A5 had an 18:3 content of 3.5%, and the other from the line A6 had a stearate (18:0) content of 24%. Seed from the five soybean var. was cold pressed, refined and deodorized without additives under lab. conditions. Two oxidation exp. were conducted. In the first, the oils were stored at 28 C for 67 days. In the second, the oils were stored at 60 C for eight days. Sensory comparisons were done by using the AOCS flavour intensity scale. The A5 and A6 oils were more stable than the commercial var. as measured by chemical tests, but the sensory data were inconclusive. Oils with similar 18:3 contents did not have similar rates of oxidation. The differences between the oils were not as distinct in the 60 C test as in the 28° C test. AS

2751 Miller (LA) and White (PJ). Quantification of carbonyl compounds in oxidized low-linolenate, high-stearate and common soybean oils. Journal of the American Oil Chemists" Society 65(8); 1988; 1328-1333

The carbonyl compounds in five oxidized soybean oils (SBO) of various fatty acid comp. were determined. Three were from common normal soybean var. and two were from lines developed from new mutant var. One mutant line had a linolenate (18:3) content of 3.5% (A5), and one had a stearate (18:0) content of 24% (A6). SBO were stored at 28 C and 60 C. Trichloro phenylhydrazones (TCPH) of carbonyls formed during oxidation were quantified and tentatively identified by gas chromatography. The storage temp. and the comp. of the oils affected the types and amounts of volatiles produced. Hexanal was the major volatile in the oilsin both storage tests. After 60 C storage, 2- and/or 3-hexenal was present only in the oil with the highest 18:3 content (BSR 101, 18:3 = 9%). The amounts of the carbonyls formed in A5 were 2 to 5 times less than the amounts formed in BSR 101. The amounts of many of the carbonyls were converted into relative flavour potency by using reported data. After storage at 28 C, 2- and/or 3-hexenal was the second most intense flavour compound regardless of the 18:3 content of the oil. The amount of a compound and the threshold value did not always predict its flavour importance according to the flavour potency data. AS

SPICES AND CONDIMENTS

2752 Satchell (FB), Bruce (VR), Allen (G), Anmdrews (WH) and Gerber (HR). Microbiological survey of selected imported spices and associated fecal pellet specimens. Journal of the Association of Official Analytical Chemist's. 72(4); 1989; 632-637

A microbiological survey was performed on 4 selected imported spices; black peppercorns, white peppercorns, coriander, and fennel seed. Aerobic plate count values ranged from 10^4 to 10^7 colony forming units (CFU)/g for black and white peppercorns and from 10^3 to 10^5 CFU/g for coriander and fennel seed. Combined results of the 3-tube most probable number procedure and the API 20E kit indicated the presence of Escherichia coli in 4 test samples of black peppercorns, 1 test sample of white peppercorns, and 1 test sample of coriander. Two test samples of black peppercorns were positive for Salmonella contamination. Among the various Enterobacteriaceae isolated from the spices, Enterbacter cloacae and Klebsiella pneumoniae were found most frequently in all spice types. Of 18 mammalian and avian fecal pellets removed from the spices and analyzed microbiologically, E. coli was found in only 2 pellet specimens. There was no apparent relationship between the enteric microflora found in spices and those found in the fecal pellets. AS

Condiments

Papads

2753 Kulkarni (SG), Saxena (AK), Manan (JK) and Berry (SK). Studies on packaging and storage of North Indian spiced papads made from blends of different dhals (split pulses). Journal of Food Science and Technology, India. 26(3); 1989; 121-125

Packaging and storage studies were conducted on North Indian spiced papads prepared from different blends of black gram (Phaseolus mungo L.), Bengal gram (Cicer arietinum L.), lentils (Lens culinaris Medicu), red gran (Cajanus cajan L)) and green gram (Phaseolus aureus Roxb). Equilibrium relative humidity (ERH) of these papads (initial moisture 13.1 -13.6%) ranged from 58.2 to 58.6%. Moisture, pH and alkalinity decreased gradually during 4 months storage under ambient conditions. Sensory quality of fried papads remained acceptable upto 4 months storage. The quality of papads made from blends containing Bengal gram or red gram was as good as that prepared from black gram. However, the colour deteriorated slightly in papads prepared from blends containing lentils. AS

2754 Saxena (AK), Kulkarni (SG), Manan (JK) and Berry (SK). Studies on the blends of different pulses (Bengal gram, green gram, lentils and arhar) in the preparation of North Indian spiced papads. Journal of Food Science and Technology, India 26(3); 1989; 133-136

The possibility of preparation of papads from different dhal (dehusked split pulses) flours with or without the addition of black gram dhal (Phaseolus mungo L.) flour has been examined. Only blends of dhal flours comprising black gram:Bengal gram (70:30), black gram;arhar (80:20), blackgram:lentils (60:25:15) and black gram:green gram:lentil (80:20) yielded papads with acceptable physico-chemical and sensory quality attributes. The papads prepared from the blend of black gram:green gram:lentils (60:25:15) showed better colour, aroma, taste and texture. AS

Essential oils

2755 Boelens (MH) and Valverde (F). Aroma chemicals and citrus oils. Perfumer & Flavorist 13(5); 1988; 1-12

Covers analysis of citrus oils, constituents of citrus oils, and citrus aroma chemicals. BV

2756 Lamparsky (D) and Klimes (I). Heterocyclic trace components in the essential oil of coriander. Perfumer & Flavorist 13(5); 1988; 17-25

2757 Lawrençe (BM). Progress in essential oils. Perfumer & Flavorist 13(4); 1988; 69-78

Covers ginger oil, Origanum oil and grapefruit oil. BV

Spices

2758 Hassel (J). Spice alternatives for microwave applications. Cereal Foods World 34(4); 1989; 340-341

This article suggests the need to develop spice alternatives which offer clearcut advantages over ground spice, including flavour standardization, excellent control of flavour delivery and consistency, functionalities, heat and freeze than stability, excellent microbial properties, potential salt reduction and favourable economics. PHR

2759 Kaul (M) and Taneja (N). A note on the microbial quality of selected spices. Journal of Food Science and Technology, India 26(3); 1989; 169-170

Ginger

2760 Okwuowulu (PA) and Nnodu (EC). Some effects of pre-storage chemical treatments and age at harvesting on the storability of fresh ginger rhizomes (Zingiber officinale Roscoe). Tropical Science 28(2); 1988; 123-125

In this investigation some effects of prestorage chemical treatments and age at harvesting on the stability of fresh ginger rhizomes were studied postharvest applications of benomyl (750 p.p.m. a.i.) gibberelic acid (150 p.p.m.) or a mixture of two to ginger rhizomes harvested at 4, 5, 6, 7, and months after planting were assessed. The results showed the mixture of benomyl and gibberelic acid was most effective in controlling rot, wt. loss and sprouting where as gibberelic acid at 150 p.p.m. had no effect on sprouting but benomyl at 750 p.p.m. a. i. significantly controlled rots. Rhizomes harvested 6 months after planting were most suited to prolonged storage in moist sawdust which was effective in controlling dehydration of ginger rhizomes. NGKR

2761 Oti (E), Okwuowulu (PA), Ohiri (VU) and Chijioke (GO). Biochemical changes in ginger (Zingiber officinale Roscoe) rhizomes stored under river sand and under dry grass in pits in the humid tropics. Tropical Science 28(2); 1988; 87-94

In this paper the effect of different preservation methods for ginger affect its chemical quality with particular reference to Nigerian var. meant for export market has been investigated. Rhizomes of Black and yellow var. of ginger harvested at maturity and without blemish were stored under dry grass and under river sand in pits without prestorage chemical treatment for 12 wks and were analysed periodically for the macronutrients and some other metabiolites of nutritional importance. Moisture losses ranged from 4.23% to 9.88%. Total reducing sugars and ascorbic acid losses ranged from 57% to 97.8% and 31.7% to 42.3%. There were no losses in true protein, total carotenoids, total lipids, acid-insoluble ash and crude protein. The two techniques viz storage under river sand and dry grass were found to be economical and are effective in keeping the rhizomes in good nutritive and organoleptic quality for 3 months. NGKR

SENSORY EVALUATION

Nil

FOOD STORAGE

Nil

INFESTATION CONTROL AND PESTICIDES

2762 Payne (CC). Microbial control of insect pests. Current and potential uses. Chemistry and Industry 6; 1989; 182-186

This article discusses current uses of microbial pesticides in northern Europe (Bacillus thuringiensis, insect pathogenic fungi, insect viruses, and insect parasitic nematodes, factors constraining the wider use of microbial pesticides and opportunities the role of biotechnology in the future development of microbial pesticides. BV

2763 Singh (SK) and Fan (LT). A biopolymer based pesticide delivery system for insect suppression in stored grains. Pesticide Science 25(3); 1989; 273-288

Degradation of grain quality during storage is mainly caused by insects and microorganisms. To protect against insects, prevailing practices usually require the application of pesticides and fumigants directly to the stored grain; long-term storage can involve repeated applications. Direct application results in accumulation of chemical residues on the grain, especially from pesticides. A simple delivery system, in which the pesticide (chlorpyrifosmethyl) is incorporated in a biopolymer (xanthan gum), has been formulated with the objective of reducing these residues while increasing the period of effectiveness of a single application. The biopolymer-based formulation was compared to a conventional formulation on the basis of bioassay tests and residue analysis. The biopolymer-pesticide formulation was effective over a longer period of time and produced significantly smaller residues than the conventional emulsifiable concentrate formulation. AS

Insects

2764 Yadav (TD). Efficacy of deltamethrin against storage insects in rice and wheat under FCI's storage system. Pesticides 22(12); 1988; 39-43

Field trails with deltamethrin (K-othrine 2.5% WP) was conducted in godowns of Food Corporation of India situated at CTO, Gheora and Dudahera using stacks of rice and wheat. Deposits at 20 mg/M^{2} and 10 mg^{2} were produced on the stack surface of jute and also on the alley ways floor. Discs of jute and polythene surfaces were collected and used in assay of persistence in the lab. Long persistence toxicity of 120-179 days was observed on jute surface against beetles. Similar kill was found in the godowns also. Samples of wheat and rice drawn from treated stacks during 6 months of storage both in winter and summer months showed very efficient protection. The residue was also estimated regularly and found below level of detection. The utilisation of this insecticide in respect to Indian godowns have been advocated as an alternative to malathion. AS

Sitophilus oryzae

2765 Srinivasa Rao (CG) and Kameswara Rao (P). Effect of food on the susceptibility of rice weevil Sitophilus oryzae Linnaeus to newer insecticides. Pesticides 22(12); 1988; 17-19

Investigations on the effect of different foods on the susceptibility of adult rice weevil Sitophilus oryzae Linnaeus to some insecticides were carried out. Among the five insecticides tested, fenvalerate was highly toxic to rice weevil developed on rice with the LC_{50} value of 0.003496 followed by decamethrin (0.004718), fenpropathrin (0.005674), cypermethrin (0.008242) and malathion (0.0089232). In the host food wheat, the same chemical, i.e., fenvalerate was found to be the effective chemical with LC_{50} value of (0.0021867) followed by decamethrin (0.006889), cypermethrin (0.007442), malathion (0.008097) and fenpropathrin (0.0082352). In the host food, sorghum, fenpropathrin was found to be the effective insecticide with the LC_{50} value of 0.0058923 followed by decamethrin (0.0059302), cypermethrin (0.006693), fenvalerate (0.006889) and malathion (0.11033). In the host food, maize, decamethrin was the effective chemical with the LC_{50} value of 0.0055258 followed by cypermethrin (0 fenvalerate (0.0067728), malathion (0.00691313) and fenpropathrin (0.0090182). AS

BIOCHEMISTRY AND NUTRITION

Biochemistry

2766 Bitsch (R), Salz (I) and Hotzel (D). Biotin assessment in foods and body fluids by a protein binding assay (PBA). International Journal for Vitamin and Nutrition Research 59(1); 1989; 59-64

The biotin content of plant and animal food samples as well as human plasma and urine sp. was assessed by a modified protein binding assay (PBA). Protein bound biotin in samples was released by digestion with papain, food samples were in addition treated previously with liquid nitrogen. Comparing analyses by use of the conventional microbiological test with L. plantarum resulted in slightly enhanced biotin values, in case of plasma by 9.2% and incase of urine by 10.3%, but the results obtained by both methods correlated well (r = 0.926 for plasma and 0.934 for urine). Regarding food analysis the additional comparison of different disintegration procedures led to best reproducible results by using the PBA with preceeding papain digestion. AS

2767 Kuber Singh (R) and Krishnakantha (TP). Intestinal epithelial cell glycoproteins in albino rats in retinol deficiency. Journal of Food Science and Technology, India 26(3); 1989; 145-149

Retinol deficiency in rats leads to changes in the intestinal epithelial cell membrane glycoproteins. A significant, quantitative decrease in one of the component glycoproteins was observed in the villus cell fraction. Lithium diiodosalicylate extraction of the cell membrane glycoproteins followed by electrophoretic analysis supported the above observation. Cell agglutination studies with lectins indicated a decreasing trend in the titer in the villus fraction in retinol deficiency. This suggests a cell surface change in the epithelial villus cells as they differentiate and move up the villi. Carbohydrate comp. of isolated glycoproteins showed a significant reduction in mannose, which was supported by tracer studies indicating reduced incorporation of mannose. These results have been discussed in the light of the effects of retinol deficiency on epithelial cell glycoproteins in the process of differentiation of villus cells. AS

2768 Kuber Singh (R) and Krishnakantha (TP). Intestinal epithelial cell alkaline phosphatase in retinol deficient albino rats. Journal of Food Science and Technology, India 26(3); 1989; 150-153

The activity of rat intestinal epithelial cell alkaline phosphatase revealed a significant decrease in the villus cells in retinol deficiency. There was no recognisable decrease in activity from the cells of the crypt region. Non-specific esterase activity also exhibited a similar trend. A significant decrease in activity was noted in the middle fraction in retinol deficiency. The cell count showed a significant difference in the lower villus-middle zone in retinol deficiency indicating a reduced ability of the cells to migrate out of the crypt zone. An assessment of the activity of the soluble and membrane forms of alkaline phosphatase suggested a vectorial gradation in activity. Electrophoretic analysis of alkaline phosphatase isoenzymes revealed minor changes only in the villus and middle fraction in retinol deficiency. AS

2769 Persson (H), Nair (BM), Frolich (W), Nyman (M) and Asp (N-G). Binding of mineral elements by some dietary fibre components In vitro (II). Food Chemistry 26(2); 1987; 139-148

The ability of some fibre preparation (soluble fibre fractions of wheat bran and whole-grain wheat bread-dough, a bulk-laxative - Inolaxol-and cellulose) to bind copper (II), zinc (II) and cadmium (II) ions has been studied using a potentiometric method. Soluble fibre fractions of wheat bran and whole-grain wheat bread-dough, in which most of the phytate was present, interacted strongly with the metals ions. Incubation of these fractions with phytase reduced the complexing ability, indicating the active ligand to be phytate. Inolaxol (a bulk laxative containing about 80% Sterculia gum) also bound a considerable amount of the three metals, which could not be explained by the Sterculia gum itself. The complexing ability of cellulose was negligible. AS

TOXICOLOGY

2770 Fisher (MJ), Sakata (T), Tibbels (TS), Smith (RA), Patil (K), Khachab (M), Johansson (SL) and Cohen (SM). Effect of sodium saccharin and calcium saccharin on urinary parameters in rats fed prolab 3200 or AIN-76 diet. Food and Chemical Toxicology 27(1); 1989; 1-9

2771 Hall (JL), Collins (LA), Barrowman (G) and Barrowman (J). Food-associated intoxicants. Progress in Food and Nutrition Science 12(1); 1988; 1-43

This article reviews the wide spectrum of food associated toxicants outlining the mechanisms by which these substances reach the food products. Naturally-occurring toxicants in fresh food carbohydrates, lipids, proteins and amino acids, antinutrients, vitamins and antivitamins, and other-mushrooms, favism, lathyrism, djenkol beans, coturnism, cycad toxicity, cassava, ackee fruit, pyrrolizidine alkaloids, spices, toxic honeys; toxins in foods of marine origin, puffer, scombroid, fish egg toxins, paralytic shellfish poisoning, and ciguatera toxin); contamination of food toxin production in imperfectly stored food (bacterial toxins, mycotoxins, aflatoxins, minanata bay mercury poisioning, cobalt in beer, epping jaundice, methylmercury poisioning in Iraq, polybrominated biphenyls in Michigan, toxic oil syndrome, the Australian wine scandal and the Chernobyl nuclear disaster); food production (pesticides, deposition of toxicants from the atm. on vegetable foods, antibiotics, marine toxins from industrial sources); processing and preservation (irradiation, coffee roasting, machine oils, antioxidants in foods, smoked foods, nitrosamines, flavour and flavour enhancers, sweetening agents-saccharin, cyclamates, aspartame, food dyes stabilizing agents; food packaging, leaching of toxicants from utensils, cooking and milk are discussed. 132 references. BV

2772 Marquardt (RR) and Arbid (MSS). Protection against the toxic effects of the favism factor (divicihe) in rats by vitamins E, A and C iron chelating agents. Journal of the Science of Food and Agriculture 43(2); 1988; 155-166

2773 Rotehnbucher (L) and Kobler (H). Determination of benzene and toulene in foodstuffs offered in petrol stations. Deutsche Lebensmittel-Rundschau 85(5); 1989; 140-142 (De).

A method for the quantitative detn. of benzene and toluene in foodstuffs is described. The samples investigated were foodstuffs, which are offered in petrol stations. After enrichment by steam distillation and simultaneous extraction of the distillate with tert-butylmethylether benzene and toluene are determined by Capillary-GLC-FID and Capillary-GLC-MS. Deuterated benzene and toluene are used as internal standards. The limit of detn. is about 20 µ g/kg. AS

2774 Trauhaut (R), Le Bourhis (B), Attia (M), Glomot (R), Newman (J) and Caldwell (J). Chronic toxicity/carcinogenicity study of trans-anethole in rats. Food and Chemical Toxicology 27(1); 1989; 11-20

Mycotoxins

Aflatoxins

2775 Lebron (CI), Molins (RA), Walker (HW), Kraft (AA) and Stahr (HM). Inhibition of growth and aflatoxin production of aspergilli in medium containing phosphates. Journal of Food Protection 52(1); 1989; 4-6

The effect of addition of pure or blended pyro, poly or metaphosphates on growth and aflatoxin production by Aspergillus flavus and A. parasiticus has been studied. CTD

2776 Wood (GE). Aflatoxins in domestic and imported foods and feeds. Journal of the Association of Official Analytical Chemist's 72(4); 1989; 543-548

The report summarises data generated on aflatoxins level in foods and feeds through FDA complaince programme. MNK

GENERAL

2777 Firmin (A). A simple technique for the production of dehydrated attieke in rural areas in Cote d'Ivoire. Tropical Science 29(1); 1989; 39-45

A simple technique has been developed without new equipment additional to that commonly used by traditional attieke processors. Slight changes were observed in the proximate comp. but that did not affect the organoleptic quality. Dehydrated attieke can therefore be recommended for production in rural areas with the advantage of longer shelf-life in storage. This could assist in increasing food supply in rural areas. BV

2778 Greenwood (DJ). Plant nutrition and human welfare. The world scene. Journal of the Science of Food and Agriculture 48(4); 1989; 387-410

This review covers the role of plant nutrition in human welfare by providing more food. Discusses the problem of increasing yields in developing countries. Recycling nutrients, opportunities for developing new agronomic practices in developing countries. Application of quantitative theory; sensors for measuring key features about soils and crops; innovative soil/water/nutrient management practices; plant nutrition and pollution in urban soils; forests and conclusions. NGKR

2779 Kahnert (K) and Hellwig (W). Innovation and up-grading of products in the food industries. Lebensmittelindustrie 35(5); 1988; 193-195 (De).

2780 Poole (S). The foam-enhancing properties of basic bipolymers. International Journal of Food Science and Technology 24(2); 1989; 121-137

Protein systems containing both basic (high isoelectric point) and acidic (low isoelectric point) components exhibit markedly enhanced foaming properties, to an extent that significant amounts of lipids (up to 30% by wt.) can be tolerated without detriment. The enhancement in foaming results from increased protein-protein interactions at the bubble surface, giving a more resilient film. Lipids, even at low levels, usually inhibit the foaming of proteins. Consequently such mixed protein systems may have potential applications in the development of novel whipped foods. The change and structural requirements of basic proteins for foam enhancement have been identified. For practical purposes they must have an isoelectric point of 9 or greater and mol wt. of 4000 daltons or greater. Basic whey protein may be prepared by esterification in alcohol. This material has an isoelectric point between 9 and 9.5 and enhances the foaming of acidic proteins. Chitosan, a basic polysaccharide obtained from fungi, crab and shrimp shells exhibits comparable or even superior foam-enhancing properties to basic proteins, particularly low mol. wt. forms. The foaming properties of different chitosan, protein and lipid formulations are reviewed, and potential areas of use of basic biopolymers in food processing are discussed. AS

2781 Raeuber (H-J). Development of the food production by key technologies. Lebensmittelindustrie 35(5); 1988; 200-201 (De).

FOOD PROCESSING

2782 Bhattachrya (S). Extrusion of foods and its possible application in Indian food industries. Indian Food Industry 8(4); 1989; 1-8

The author describes in detail the concept of extrusion cooking, the advantages of food extrusion, functions of an extruder and the merits and demerits of the single screw and twin-screw extruders. The different parameters for assessing the quality of extruded products are discussed. The wide range of food products obtainable through extrusion are covered in brief. GP

2783 Ehlermann (DAE). Food irradiation - pros and cons. Indian Food Industry 8(4); 1989; 9-14

The author describes the principle of processing of foods by the application of ionising radiation supplementing other methods most effectively which would avoid huge losses of food. The limitations with particular reference to increase in safe food supply thus contributing to primary health care and the pros and cons of their technology and to workout the application which are beneficial under the circumstances of a given society and a given trade are also discussed. GP

FOOD PACKAGING

2784 Agarwal (BN). PET bottles and containers for food and beverages industries. Modren Packaging Trends (1); 1988; 53-59

2785 Bleische (G) and Brosamler (H). Automation of packaging plants. Lebensmittelindustrie 35(5); 1988; 197-199 (De).

FOOD ENGINEERING AND EQUIPMENT

Engineering

2786 Lees (A), Kent (M) and Christie (RH). The effect of pre-drying temperature on the sorption properties of microcrystalline cellulose at temperatures up to 90 C. International Journal of Food Science and Technology 24(2); 1989; 163-172

Using a specially-constructed oven and sorbostats the sorption isosteres for microcrystalline cellulose have been obtained at temp. between 25 and 90 C. Differences are shown between pre-drying at 105 C and pre-drying at the temp. of sorption. The sorption isosteres are not straight lines as expected. AS

2787 McGuire (J) and Kirtley (SA). Surface characterization for prediction of food particle behaviour at interfaces. Theoretical considerations and limitations. Journal of Food Engineering 8(4); 1988; 273-286

2788 Povey (MJW) and McClements (DJ). Ultrasonics in food engineering. Part I. Introduction and experimental methods. Journal of Food Engineering 8(4); 1988; 217-245

This review covers various aspects of the use of ultrasound in non-destructive testing with a special emphasis on their relevance to food engineering. Describes ultrasonic propagation through viscoelastic media, propagation across interfaces; ultrasonic techniques; sources of error; transducers; and conclusions. NGKR

ENERGY IN FOOD PROCESSING

Nil

FOOD CHEMISTRY AND ANALYSIS

Chemistry

2789 Esteban (MA), Marcos (A), Fernandez-Salguero (J) and Alcala (M). An improved simple gravimetric method for measurement of high water activities. International Journal of Food Science and Technology 24(2); 1989; 139-146

A previously reported gravimetric method for measurement of water activity has been simplified and improved, to determine water activity in the range from about 0.700 to 0.999. Extrapolated water activity values about 0.990 gave average underestimates of -0.001 water activity units with the improved method. Comparative results on various dairy products were in good agreement with those found by reference method (thermocouple psychrometer). The differences between the results provided by both methods were smaller for products with very high water activity values than for products with high and intermediate water activity values. AS

Chemistry(Analytical)

2790 Goodman (BA), McPhail (DB) and Duthie (DML). Electron spin resonance spectroscopy of some irradiated foodstuffs. Journal of the Science of Food and Agriculture 47(1); 1988; 101-111

Electron spin resonance (ESR) spectroscopy has been used to examine components from Gamma-irradiated fish, meat and fruit produce in order to identify areas in which the technique may be of use in detecting an irradiation history. Results show that, in the studied samples of the flesh of meat, fish and fruit, stable radical sp. are not formed on irradiation, this indicates that ESR will have no applications for determining a radiation history of such specimens. However, stable ESR signals are obtained in components where radical centres can be stabilised within a crystalline or protein matrix. Thus bone from meat or fish yields a characteristics ESR signal at levels likely to be used commercially, altough signal intensity appears to be related to the degree of crystallinity of the hydroxyapatite. This would be a complicating factor in determining quantitative radiation exposure measurements. Similarly a radiation-induced ESR signal can be observed in scampi shell. The signal appears to be associated with the chitin component and this cooking, either before or after irradiation, can result in a major decrease in signal intensity as a result of chitin degradation. Several radical sp. were similar to those obtained from organic peroxy radicals. These sp. were of limited stability restricting any practical ESR detn. to within a few days of treatment. Stable free radical centres are produced in the seeds of fruit, but their spectra generally resemble those of the naturally occurring melanin-type pigments. Since the concn. of the latter may vary considerably as a result of natural factors such as exposure to sunlight, ESR has limited applications in the diagnosis of an irradiation history in such materials. With irradiated grapes a weak spectral component that was not present in unirradiated specimens was observed in the seeds. It is possible therefore that the ESR method could be useful for detecting irradiated grapes. AS

2791 Hoyland (DV) and Taylor (AJ). A modified distillation method for the detection of fat oxidation in foods. International Journal of Food Science and Technology 24(2); 1989; 153-161

A rapid distillation procedure for the estimation of fat oxidation in food using the 2-thiobarbituric acid test has been developed. The apparatus generates steam rapidly and allows high sample throughput while minimizing cleaning of glass ware. Using the standard compound, tetramethoxypropane (TMP), and a number of food samples spiked with standard, the recovery of malondialdehyde was determined and suitable operating conditions selected. Levels of TMP equivalent to TBA numbers between 1 and 10 were used. Recovery of standard increased from 25.3% at 20 ml to 81.6% at 120 ml, and recoveries at different TBA numbers were similar. After consideration of various factors, 50 ml was chosen as the distillate vol. and was collected in about 4 min. With food samples, the recovery varied depending on the comp. of the food and, in order to determine TBA number, it was necessary to calculate recoveries from each type of sample. In the reaction of distillate with thiobarbituric acid, colour development was found to be extremely temp. sensitive, and careful temp. control of the heating bath was required. AS

2792 Kato (H), Nagai (Y), Yamamoto (K) and Sakabe (Y). Determination of polysorbates in foods by colorimetry with confirmation by infrared spectrophotometry, thin-layer chromatography, and gas chromatography. Journal of the Association of Official Analytical Chemists 72(1); 1989; 27-29

A method is presented for the detection of polysorbates (PSs) in 8 kinds of processed foods by colorimetric and thin-layer chromatographic (TLC) techniques. The PSs are extracted from processed foods with a mixture of methylene chloride and ethanol by using an extrelut column. The extract is further purified by using a silica gel column. The PS extract is complexed with cobalt-thiocyanate (Co-thiocyanate) reagent and is determined spectrophotometrically at 620 nm. The recoveries and coeff. of variation for 8 kinds of processed foods fortified with 0.1% PS 80 were 67.9-94.6% and 4.0-11.3%, resp. The detection limit of TLC corresponded to 50 mg PS 80/kg. PS identity was confirmed by infrared spectrophotometry of PS extract, and gas chromatography of fatty acids and thin layer chromatography of POE-sorbitan residues after saponification. AS

2793 Salter (LJ), Mottram (DS) and Whitfield (FB). Volatile compounds produced in Maillard reaction involving glycine, ribose and phospholipid. Journal of the Science of Food and Agriculture 46(2); 1989; 227-242

Previous studies suggest that phospholipid affects the production of volatile heterocyclic compounds during cooking by participating in the Maillard reaction, and also plays an important role in the formation of the characteristic aroma of cooked meat. These effects can be mimicked using aqueous model systems. The identities of 109 volatile products of model Maillard reactions involving glycine and ribose, with and without phospholipid, have been investigated using GC-MS and the individual odours of these systems noted during sensory assessment of the effluent from the GC. The incorporation of phospholipid increased the overall number of volatile compounds and var. of odours produced, as well as altering the nature of the dominant components and aromas. AS

2794 Yamada (S), Noda (N), Mikami (E), Hayakawa (J) and Yamada (M). Analysis of natural colouring matters in food. III. Application of methylation with diazomethane for the detection of lac colour. Journal of the Association of Official Analytical Chemists 72(1); 1989; 48-51

A new method has been proposed for detection of lac colour in food. Lac colour is a natural colour additive derived from a secretion of the insect Coccus Laccae (Laccifer lacca Kerr). It is extracted from food with methanolic oxalic acid and eluted from a column of Amberlite XAD-2 with the same solvent. The fraction containing the lac colour is treated with diazomethane to produce 2 reddish-orange markers. The marker sp. in the reaction mixture are detected by both thin-layer chromatography and reverse-phase liquid chromatography. AS

FOOD MICROBIOLOGY AND HYGIENE

Enzymes

2795 Lonsane (BK) and Ramakrishna (M). Microbial enzymes in food processing industry. Present status and future prospects in India. Indian Food Industry 8(4); 1989; 15-22

Biotechnological processes as applied to food industries for the purposes of imparting a number of derived changes in the foods by the action of microorganisms or the products are well known. The current awareness of the importance of processed and convenience foods find the necessity of microbial products such as enzymes. The article gives a descriptive information about the types of enzymes suitable for specific purpose, availability and potential application in the food industries with reference to Indian situations in particular. GP

Fermented foods

2796 Tewary (HK) and Muller (HG). Some chemical and physical characteristics of Wari, an Indian fermented foods. Food Chemistry 32(4); 1989; 269-276

In this paper the chemical and physical characteristics of warian a traditional Indian fermented food, have been studied and results presented. This produced in Indian subcontinent and consists of pieces of legume dough, often fermented and sundried. These are hollow brittle cakes of 2-30 CM^2 spread and 1-30 g in wt. The proximate analysis of 16 samples according to AACC for moisture, protein, crude fat, crude fibre, ash and carbohydrates showed differences due to drying and the variations in the ingredients. The extent of any fermentation was assessed by detn. of L- and D- lactic acid. Drying caused case hardening resulting in a cavity or porous structure of the product. Evaluation of these and other physical characteristics of warian was carried out in these studies. NGKR

Microorganisms

Algae

Spirulina

2797 Roughan (PG). Spirulina. A source of dietary gamma-linolenic acid. Journal of the Science of Food and Agriculture 47(1); 1989; 85-93

Spirulina powers obtained from different commercial sources contained 23.6-38.0 mg g^{-1} DM as long-chain fatty acids and 3.4-6.0 Mg g^{-1} DM as Gamma-linolenic acid (6, 9, 12-octadecatrienoic acid). However, Gamma-linolenic acid constituted up to 40% of the total fatty acids within the isoalted galactolipids. Unesterified fatty acids accounted for 8.4-66.9% of the fatty acids recovered from the different samples; the remaining fatty acid were in glycerolipids. There was also a wide variation in the contents of photosynthetic pigments among the different preparation. Spirulina was four-fold more expensive than evening primrose oil as a source of alpha-linolenic acid to supplement human diets. Since alpha-linolenic acid (9, 12, 15-octadecatrienoic acid), (E)-3 hexadecenoate, 3-sn-phosphatidylcholine and 3-sn-phosphatidyl ethanol amine were not detected in the lipid extracts, none of the samples was significantly adulterated by eucaryotic algae. From an analysis of the extracted lipids it was possible to make some predictions both about the manner in which the cells were cultured and the post-harvest treatment of the preparations. AS

Bacteria

Escherichia coli

2798 Roca (M) and Kalman (I). Antagonistic effect of some starter cultures on Enterobacteriaceae (E. coli). Meat Science 25(2); 1989; 123-131

The ability of Lactobacillus jensenii and Streptococcus 17SB to inhibit Escherichia coli was demonstrated. The practical application of the inhibition was examined. Possible roles for several factors in the mechanism of inhibition of Lactobacillus jensenii and Streptococcus 17SB are briefly disccused. The effects of pH reached and acids produced by starters on the growth of Escherichia coli are described. AS

Fungi

Mushrooms

2799 Pecora (RP). Determination of protein in edible mushroom (Boletus spp.). International Journal of Food Science and Technology 24(2); 1989; 207-210

This study provides a simple and inexpensive procedure for total and direct protein detn. in mushrooms avoiding the overestimation produced by NPN in Kjeldahl detn., and the inaccurate use of the standard conversion factor. AS

Hygiene

2800 Everson (TC). Industry response to the problems of pathogenic bacteria. Journal of Dairy Science 71(10); 1988; 2820-2829

An on-farm assessment of sources of pathogenic bacteria in milk are presented. Control of pathogenic bacteria through on-farm sanitation and herd management programs are covered. The processing plant environment and controls enacted in response to the menace of emerging pathogens are reviewed. The current status of pathogen incidence and sources in dairy plants as evidenced by surveys provided by national trade organizations are also be presented. AS

2801 Wolf (ID) and Lechowich (RV). Current issues in microbiological food safety. Cereal Foods World 34(6); 1989; 468-472

This article discusses microbiological safety of food. Aspects covered include emerging pathogens, reported cases vs actual, infection vs intoxication, food poisoning microorganisms (Salmonella, Staphylococcus aureus, Clostridium perfringens, Clostridium butulinum, Listeria monocytogenes, Campylobacter, Escherichia coli, Yersinia enterocolitica, and Vibrio) and consumer trends. BV

BIOTECHNOLOGY

2802 Mohr (KH) and Schulze (R). Membrane separation processes in food technology and biotechnology (Part I.), Lebensmittelindustrie 35(5); 1988; 202-206 (De).

The author reviews the new results in the field of membrane separation processes in food industry and biotechnology. Covers the energy demand, the costs, the development of membranes, new concepts of processes and equipment, factors of influence on the steam density of the permeate and the cleaning and disinfection of membrane separation plants. 10 references. BV

TISSUE CULTURE

Nil

FOOD ADDITIVES

Antimicrobials

2803 Balley (AV), De Lucca II (AJ) and Moreau (JP). Antimicrobial properties of some erucic acid-glycolic acid derivatives. Journal of the American Oil Chemists" Society 66(7); 1989; 932-934

Twelve fatty acid derivatives of glycolic acid containing erucic acid, or other selected vegetable oil fatty acids, were synthesized. These were screened for antimicrobial activity against a gram-positive bacterium, Staphylococcus aureus; a gram negative bacterium, Escherichia coli; a mold, Penicillium notatum, and a yeast, Candida utilis. All of the compounds inhibited at least one of these organisms. These compounds were derivatives of glycolic acid prepared by esterification of the carboxyl function of glycolic acid with long-chain fatty alcohol and reaction of the hydroxyl function of glycolic acid with a long-chain fatty acyl group. AS

Antioxidants

2804 Burton (GW). Antioxidant action of carotenoids. Journal of Nutrition 119(1); 1989; 109-115

Several modes of antioxidant action of Beta-carotene are discussed. In particular, the focus is on the ability of Beta-carotene to function as a chain-breaking antioxidant in a lipid environment at physiological oxygen partial pressure. This is the mode considered most likely to operate in mammalian cells. AS

Colourants

2805 Saito (K) and Fukushima (A). An improved method for large-scale isolation of a water-soluble safflower pigment from Dyer's saffron flowers. Food Chemistry 32(4); 1989; 297-306

In this paper an improved method for obtaining saffron pigments from the floral extract has been reported. The pigment was separated from the alcoholic extract of the bright yellow florets of dyers saffron by fixing it with BD-cellulose in an acidic solution and purified by successive column chromatographics. This pure sample obtained was compared with an authentic safflron yellow B. This technique will be of help in large scale isolation of safflron yellows and related pigments which are applicable to processed foods and soft drinks as natural harmless and safe colour additives. NGKR

Emulsifiers

2806 Riego Martin (MB) and Gomez Herrera (C). Interfacial physical chemistry of food-grade emulsifiers. Part I. Solubility and interaction with aqueous media. Crasas Y Aceites 39(1); 1988; 44-51 (De).

The three most important types of emulsifiers (proteins, phospholipids and nonionic polyol derivatives) are considered. The effect of temp. on the solubility of polyol derivatives in aqueous and oily media are discussed. The knowledge of the phase-inversion temp. (PIT) of food emulsions is very important to estimate their stability. The main mesophases (lamellar, hexagonal, cubic phases), as well as the so-called gel phase, which take part in phase diagrams for phospholipids and polyol derivatives, are described. Characteristic binary-phase and ternary-phase diagrams for lecithins and monoacylglycerols are analysed. AS

Flavourings

2807 Burri (J), Graf (M), Lambelet (P) and Loliger (J). Vanillin. More than a flavouring agent-A potent antioxidant. Journal of the Science of Food and Agriculture 48(1); 1989; 49-56

This paper reports that vanillin not only used as a flavouring agent for sweet foods, but can also act as an antioxidant in complex foods containing polyunsaturated fatty acids. The keeping quality of precooked dried cereal flakes was considerably increased by the addition of 0.01-0.05% (on a dry matter basis) of vanillin. BV

Preservatives

2808 El-Shanawy (MA) and Marth (EH). Behaviour of Listeria monocytogenes in the presence of sodium propionate. International Journal of Food Microbiology 8(1); 1989; 85-94

Survival or growth of Listeria monocytogenes in Tryptose Broth supplemented with 0, 0.05, 0.1, 0.15, 0.2, 0.25, or 0.3% sodium propionate was determined when the pH of the medium was 5.0 or 5.6 and incubation was at 4, 13, 21, and 35 C. The pathogen grew in all controls, propionate-free broth, except at 4 C and pH 5.0. At pH 5.6 and 4, 13, 21 and 35 C the bacterium grew in the presence of all propionate concn. used in this study. The higher concn. permitted only minimal growth with smallest ultimate populations and longest generation times. Reducing the pH to 5.0 served to minimize growth further at 13, 21 and 35 C than that observed at the same temp. but at pH 5.6. The extent of growth was directly proportional to the propionate concn.; at high concn. propionate caused a gradual decrease in populations and/or prolonged the lag phase. At 35 C, a concn. of 0.25% did not allow growth, whereas 0.3% caused inactivation of the pathogen after 80 h of incubation. At 4 C and pH 5.0, all concn. of sodium propionate caused a gradual decrease in populations during the incubation period. AS

Stabilizers

2809 Schlemmer (U). Studies of the binding of copper, zinc and calcium to pectin, alginate, carrageenan and gum guar in bicarbonate -carbon dioxide buffer. Food Chemistry 32(4); 1989; 223-234

Using the equilibrium dialysis technique, the interaction of Cu, Zn and Ca with pectin, alginate, carrageenan and gum guar was studied. The exp. were done either in sodium hydrogen carbonate solution, the physiological bicarbonate-carbon dioxide buffer of the intestine, or in diluted HCl or NaOH to keep the ionic strength as low as possible. Great differences in the binding in both media were detected. With increasing pH the amount of metal bound to the isolated acid polysaccharides rose in diluted HCl and NaOH, reaching a max. binding at pH $>$ 5. In buffer the binding also increased with rising pH (pH 2-5), reaching a max. at pH 5-6, but declined almost to zero at pH $>$ 6. Because of low affinity no interaction could be detected in buffer between Ca and pectin, Ca, Zn and carrageenan and between Cu, Zn, Ca and gum guar. Based on the pH-dependent binding in the bicarbonate-carbon dioxide buffer, it is sugested that under relevant physiological conditions of the intestine (jejunum and ileum), the interaction of Cu^{2+}, Zn^{2+} and Ca^{2+}, with the tested isolated polysaccharides is very weak. AS

Sweeteners

2810 Walker (CE). The use of sucrose in ready-to-eat breakfast cereals. Cereal Foods World 34(5); 1989; 399-406

The author in this feature article discusses about the use and importance of sucrose on an ingredient in break fast cerels sucrose has been found to be prefarred in many surface application because of its ability to crystallyze in to a frosty surface, or to form a hard amorphous, continous glaze in the product. PHR

2811 White (JS) and Parke (DW). Fructose adds variety to breakfast. Cereal Foods World 34(5); 1989; 392-398

The authors in this feature article discusses about the physical and functional properties of fructose that distinguish it from sucrose and dextrose. The article also illustrates the advantages of min fructose in food products. Such as adding var. to food products with more sweeteness and flavour improved texture extended shelf life and reduced caloric value. PHR

CEREALS

2812 Mathewson (PR), Seabourn (BW) and Pomeranz (Y). A simple method for determination of proteinase activity. Journal of Cereal Science 8(1); 1988; 69-82

A method has been developed that is applicable for the detn. of both exo- and endo-proteinase activity in cereal extracts. The procedure is based on measurement of the fluorescent adduct formed between the alpha-amino group resulting from proteolysis and o-phthaldialdehyde in the presence of ethanethiol. This adduct can be measured fluorometrically at its emission wavelength (450 nm) or spectrophotometrically at its excitation wavelength (340 nm). Both methods respond similarly though, as expected, the fluorescence measurement is more sensitive. This assay procedure is simple, does not require separation of hydrolysis product from substrate, and overcomes many of the limitations associated with previously reported proteinase assays involving precipitation with tricholoracetic acid, dialysis or viscometric analysis. AS

2813 Morrison (WR). Lipids in cereal starches. A review. Journal of Cereal Science 8(1); 1988; 1-15

Starches in the endosperm of cereals may be unique in having appreciable quantities of monoacyl lipids inside the starch granules. These lipids are almost exclusively lysophospholipids in wheat, barley, rye and triticale, but include substantial proportions of free fatty acids (FFA) in other cereals. In addition, the starch granules may acquire surface lipids, which are mostly FFA, from the endosperm non-starch lipids. Methods for isolating suitably purified starch are discussed and lipid comp. data are given. The relationship between amylose content and lipid content in wheat, barley, maize and rice starches is described and the biological significance of the lipids is discussed. The question whether lipids exist as inclusion complexes with amylose in native starch granules or not is debated, but cannot be resolved conclusively with present exp. techniques. AS

2814 Osborne (BG) and Laal-Khoshab (A). Distribution of some essential trace elements in commercial flour mill streams. Journal of the Science of Food and Agriculture 47(1); 1989; 95-100

The Fe, Cu, Zn, Mn, Cr, Ni, Se, protein and ash contents of two different bread grists and flour samples from the first to fourth break and A to J reduction systems of a commercial flour mill were determined. Fe, Zn, Mn, and Se levels followed the trend of ash and protein with the lowest from the A, B and C rolls and highest from either the fourth break or J roll. Cu and Cr levels were relatively homogeneous among the grist and mill streams while for Ni there was only a slight increase through the break and reduction systems. AS

2815 Toma (RB) and Curtis (DJ). Ready to eat cereals. Role in balanced diet. Cereal Foods World 34(5); 1989; 387-390

The article discusses about the nutrients rich in dietary fiber, fat, sugar, sodium and other nutrients present in different commercially available RTE (Ready-to-eat) cereals available in USA. PHR

Barley

2816 Henson (CA) and Stone (JM). Variation in alpha-amylase inhibitor activities in barley malts. Journal of Cereal Science 8(1); 1988; 39-46

Malts of barley genotypes exhibiting a wide range of alpha-amylase activities were used to determine if these differences resulted from the absence of functional products of one of the two gene families which encode barley alpha-amylase. Additional studies were conducted to determine if alpha-amylase activities reflect differences in activities of a specific proteinaceous alpha-amylase inhibitor. These malts had a 43-fold variation in in vitro alpha-amylase activities. When examined by isoelectric focusing and activity staining, all genotype exhibited the same alpha-amylase isozyme patterns. In vitro amylase inhibitor activities varied only three fold. The correlation coeff. between inhibitor and alpha-amylase activities was -0.92 (P less than or equal to 0.01). Examination of two of these malts by isoelectric focusing followed by inhibitor activity staining, showed that both malts had six bands of activity with one very prominent band. It is concluded that (1) no gross absence of functional alpha-amylase isozymes occurs, thus both gene families coding for alpha-amylases are expressed, and (2) that levels of alpha-amylase inhibitor may be an important factor, but probably not the only factor, in regulating malt alpha-amylase activities. AS

2817 Ingversen (J), Englyst (A) and Jorgensen (KM). Evaluation of malting quality in a barley breeding programme, use of alpha-amylase and beta-glucan levels in malt as preselection tools. Journal of the Institute of Brewing 95(2); 1989; 99-103

The malting quality of 327 var. of barley were evaluated based on their alpha-amylase activity, and beta-glucan content. Alpha-amylase assayed by the radial immunodiffusion method and beta-glucan estimated by calcofluor-FIA method. Barley lines with high alpha-amylase and low beta-glucan content identified from these lines were compared for their malting qualities with standard malting var. It is recommended that either of methods could be recommended in breeding programmes for malting barley. NGM

2818 Macleod (LC) and Duffus (CM). Temperature effects on starch granules in developing barley grains. Journal of Cereal Science 8(1); 1988; 29-37

A Coulter Counter was used to determine size and number distributions of starch granules in a detailed investigation of starch deposition during the development of barley grains on whole plants grown at different temp. Results indicate that decreases in grain dry matter, at elevated temp. are due to a reduction in both the vol. available for starch accumulation and the numbers, rather than sizes, of starch granules deposited. Numbers of both the A-type' and the smaller or `B-type' granule populations were affected by elevated temp. AS

2819 Oh (SY) and Briggs (DE). Modification in malting barley. Journal of the Institute of Brewing 95(2); 1989; 83-88

The degree of malt modification in barley germinated for 5 days and samples withdrawn at 24 h intervals were examined for the endosperm modification by calcofluor and methelene blue histochemical techniques. In case of methelene blue method, the dye spreads around the sheaf cells, in to cracks and in to mealy regions of the starch endosperm and over estimates the modification. The calcofluor method slightly over estimates the well modified samples. Both the light and scanning electron microscopy of germinated samples indicated that the cell walls of the starch endosperm became fregmentary and were totally degraded in completely modified regions. NGM

2820 Yin (SY) and MacGregor (AW). Substrate speciality and nature of action of barley beta-glucan solubilase. Journal of the Institute of Brewing 95(2); 1989; 105-109

Barley beta-glucan solubilase was shown to be active to differing extends, towards hot water (65 C) soluble beta-glucan, CM-cellulose and cellodextrins (DP 2-8). However, the enzyme did not affect the viscosity of CM-pachyman or appear to solubilise cotton cellulose. When beta-glucan was treated with lichenase a mixture of small mol. wt. products was obtained including a DP 9 dextrin. This dextrin was not obtained when the beta-glucan was treated with beta-glucan solubilase prior to hydrolysis by lichenase. It has been concluded, therefore, that this beta-glucan solubilase is and endo-type glucanase, which appears to attack the small proportion of long blocks of (1->4)-beta-linked glucosyl residues reported to be present in barley Beta-glucan. AS

2821 Yin (XS), MacGregor (AW) and Clear (RM). Field fungi and Beta-glucan solubilase in barley kernels. Journal of the Institute of Brewing 95(3); 1989; 195-198

The Beta-glucan solubilase of barley and malt and its relation to the seed field fungi was studied. The most common field fungi sp. were Alternaria Cladosporium, Epicoccum and Helmanthosporium. The culture of these fungal spceies and also of two bacterial sp. were incubated on surface sterilized barley and the release of Beta-glucan solubilase was examined. The Beta-glucan solubilase released has similar mol. distribution as that of the enzyme obtained from barley malt. The study indicated that fungal contamination of barley may also contribute to the Beta-glucan solubilase activity barley malt during malting and mashing process. NGM

Barley starch

2822 Yin (XS) and Roger Stark (J). Molecular modification of barley starch granules by different types of physical treatment. Journal of Cereal Science 8(1); 1988; 17-28

Barley starch granules have been subjected to physical damage under different conditions and the effects examined by iodine staining, viscometry, potentiometric iodine titration, enzymic analysis and gel chromatography. It has been confirmed that, in addition to the physical rupture of the starch granule, the mol. structure of the starch components in the granules is also affected. Amylopectin of low mol. wt. was preferentially extracted with cold water from starch granules damaged under various conditions. However, physical damage to starch granules in the presence of water resulted in the extraction of relatively more amylose than in other cases, although the ratio of amylose to amylopectin in the cold water extacts was always less than in the original starch. Extraction of starch granules with propanl-ol/water (3:1, v/v) made the granules more susceptible to damage, as judged by the quality of material subsequently extractable with cold water. AS

Oats

2823 Frolich (W), Wahlgren (M) and Drakenberg (T). Studies on phytase activity in oats and wheat using ^{31}P -NMR spectroscopy. Journal of Cereal Science 8(1); 1988; 47-53

^{31}P-nuclear magnetic resonance spectroscopy (^{31}P-NMR) was used to follow the breakdown of phytate in oats and wheat. This technique offers considerable advantages over currently used methods for the measurement of relative amounts of the intermediate metabolities of the enzymatic degradation of the parent phytate. The degradation of phytate was used as an indicator of the activity of the phytate enzyme. In contrast to earlier studies, the ^{31}P-NMR studies showed that the degradation of the phytate in both wheat and non-heat treated oats proceed at similar rates. In the commercial oat products examined, however, no degradation of phytate was observed. This strongly indicates that phytate is present in natural oats, but that the enzyme is rendered inactive by the heat treatment normally used in processing oats for food products. AS

Rice

2824 Georgiana Aniche (N) and Okafor (N). Studies on the effect of germination time and temperature on malting of rice. Journal of the Institute of Brewing 95(3); 1989; 165-167

Rice was germinated up to 7 days at 22, 24, 26, 28, 30 and 32 C and the influence of germination time and temp. as the quality malt was studied. Germination at 28 and 30 C for a period of 6 days yielded malts of high diastatic power, high cold and hot water extract, total reducing sugars and free alpha-amino N. Mashing trials with rice malted at 30 C for 6 days showed a slow and incomplete saccharification slow filteration rate and high total available extract in spent grains. The higher gelatinisation temp. of rice starch could be responsible for incomplete hydrolysis during mashing. NGM

Ryes

Rye flour

2825 Kuhn (MC) and Grosch (W). Baking functionality of reconstituted rye flours having different non starchy polysaccharide and starch contents. Cereal Chemistry 66(3); 1989; 149-154

By using the fractionation and reconstitution technique for rye flour, the changes in its baking performance were studied. The results showed that the specific vol. of bread increased with the increase in the ratios of soluble to insoluble non starch polysaccharides (NSP) or NSP/starch. Similar trand was observed when insoluble NSP or insoluble second grade starch fractions were omitted. The crumb became softer by omitting the prime starch or both soluble and insoluble NSPs. Similar effect was observed by decreasing the NSP/starch ratio. The soluble NSP and the prime starch fractions had the overall positive influence where as the insoluble NSP and the second grade starch fractions had the deleterious effect on the baking performance of rye flour. AR

Wheat

2826 Belitz (H-D), Seilmeier (W) and Wieser (H). The proteins of spelt Triticum spelta. Zeitschrift fur Lebensmittel-Untersuchung und -Forschung 189(1); 1989; 1-5 (De).

The proteins of the var. `Steiners roter Tiroler' (SRT), `Oberkulmer Rotkorn' (OKR) and `Rouquin' (ROU) of the hexaploid wheat spelt (Triticum spelta) were extracted by a modified Osborne procedure. The amounts of protein in the Osborne fractions and the amino acid comp. of the total proteins, the albumins/globulins, the gliadins and the glutenins are in the range of values for the corresponding protein fractions from soft wheat var. (T. aestivum) Rektor (REK) and `Apollo' (APO). Reversed phase HPLC of the gliadins produced very similar patterns for SRT and OKR, while ROU is somewhat different, expecially in the first part of the alpha-gliadin fraction. The pattern of REK is clearly different. The glutenin patterns of SRT and OKR obtained by RP-HPLC are also similar. ROU exhibits a different pattern and corresponds expecially in the range of the high-molecular-mass subunits to REK and to other strong var. of soft wheat. The low-mol. -mass part of the chromatograms of all three T. spelta var. differs from REK. The results of reversed-phase HPLC were confirmed by sodium dodecyl sulphate/polyacrylamide gel electrophoresis (SDS-PAGE). The high-mol.-mass pattern of SRT and OKR is similar to that of poor soft wheat var. ROU contains eight bands in this range, three of which are known to be correlated with good baking properties. Three other bands have not so far been observed in soft wheat var. AS

2827 Karwowska (K) and Kostrzewa (E). A new technology for the production of valuable vitamin extracts from wheat and rye germs. Nahrung 32(5); 1988; 491-495

A method for nearly complete extraction of the lipid fraction from wheat and rye germs was developed, and the technological parameters of the production process were specified. The resulting preparations are extracts rich in vitamin E and other biologically active components. Dermatological studies and applications in the cosmetic industry have testified to the suitability of these preparations for use in cosmetic and pharmaceutical products. Owing to their high content of unsaturated fatty acids and to a natural combination of biologically active compounds, the preparations from wheat and rye germs obtained by our method on an industrial scale find increasingly wider application. The post-extraction residue free from the lipid fraction is high value feed. AS

2828 Kaur (RD) and Hira (CK). Supplementary effect of aestivum wheat (Triticum aestivum L.), Bengal gram (Cicer arietinum L) and soybean (Glycine max L.) on protein quality of durum wheat (Triticum durum Desf). Journal of the Science of Food and Agriculture 46(2); 1989; 201-209

Chapathis and parathas were made from different combinations of durum (Triticum durum Desf) and aestivum (Triticum aestivum L) wheat to test for their organoleptic acceptability. The best accepted durum/aestivum (40:60) combination was supplemented at 10, 20, 30 and 40% levels with Bengal gram (Cicer arietinum L) flour and soy protein (Glycine max. L) conc.. Raw and cooked samples were analysed for some amino acids and trypsin inhibitor activity. The most acceptable cooked products were fed to growing rats for estimation of protein efficiency ratio, apparent digestibility and plasma proteins. Cooking resulted in considerable losses in cystine, available lysine and trypsin inhibitor activity. The losses were greater in paratha than in chapathi. Protein efficency ratio and apparent N digestibility of chapathis were significantly higher than those of parathas. However, protein quality of soy-supplemented parathas was better than that of chapathis. AS

2829 Lisker (N), Taari (E), Ashbell (G) and Henis (Y). Chemical and microbiological changes occurring in wheat silage maintained under modified atmospheres. Journal of the Science of Food and Agriculture 47(1); 1989; 125-127

In wheat silage maintained for 21 days at 26 C and 9.9 KPa water vapour pressure under a continuous flow of modified atm. (MAs-containing 20% v/v oxygen) and different concn. of carbon dioxide (from 20% v/v to 80% v/v) there was a significant increase in pH and in the colony-forming units (CFU) of aerobic bacteria, yeasts and moulds. In addition, water -soluble carbohydrates (WSC) and acetic and lactic acid decreased considerably. Similar results were obtained with a continuous flow of 90%, 95% and 99% v/v carbon dioxide (supplemented to 100% v/v with oxygen) and with 100% v/v pure oxygen. Only with silage kept in an atm. of 100% v/v carbon dioxide or of 100% v/v N no changes were observed. AS

2830 McFarlane (JA). Factors affecting insect pest management on wheat grain stored in tropical uplands. Tropical Science 29(1); 1989; 51-73

Previously unpublished data on storage climate and the incidence of storage insects and mites in grain residues and new-crop wheat, from a 1962/63 survey of wheat growers in Kenya, are presented. Implications for pest management and relevant research are discussed with regard to present circumstances and possible future developments in wheat storage. A check-list of the important insects and mites recorded in the survey is given, and the occurrences of sp. more commonly associated with grain in temperate climates are discussed. AS

2831 Michael Gould (J), Jasberg (BK) and Cote (GL). Structure-function relationship of alkaline peroxide treated legnocellulose from wheat straw. Cereal Chemistry 66(3); 1989; 213-217

Compared to wood pulp cellulose, alkaline hydrogen peroxide treated wheat straw becomes more extensively hydrated, increases more in size when hydrated, and contains a larger glucose accessible internal vol. These and other data are interpreted in terms of a model for alkaline hydrogen peroxide treated lignocellulose in which the residual, peroxide resistant lignin that remains after treatment functions as a skeletal framwork, preserving open internal structure within the lignocellulosic matrix, allowing greater water penetration and more thorough hydration of cell wall polysaccharides. AS

2832 Ng (PKW) and Bushuk (W). Effect of gamma ray and high-energy electron irradiation on breadmaking quality of two Canadian wheat cultivars. Canadian Institute of Food Science and Technology Journal 22(2); 1989; 173-176

Grain of Neepawa and HY320 wheats was irradiated with gamma rays or high-energy electrons at 10 dosages between 0 and 5 kGy in the context of using irradiation for disinfestation of commercial grain. Samples were analyzed relative to milling and baking characteristics immediately after treatment and after four months storage of the treated grain at ambient conditions. Over the range of dosages used, both forms of irradiation did not affect any of the properties examined except starch damage which showed a small increase with increasing dosage; the increase was too small to produce a measurable effect on breadmaking potential. AS

2833 Zayas (I), Pomeranz (Y) and Lai (FS). Discrimination of wheat and non wheat components in grain samples by image analysis. Cereal Chemistry 66(3); 1989; 233-237

This study describes use of image analysis of discriminate between wheat and nonwheat and between weed seeds and stones in the nonwheat part of a grain sample. Two methods of pattern recognition were used in the discrimination; multivariate discriminant analysis to distinguish between wheat and nonwheat and among weed seeds, and development of a structural prototype to distinguish between wheat and nonwheat. The structural prototype method discriminated well between wheat and nonwheat. Weed seeds were differentiated by multivariate discriminant analysis, but identification of stones posed a problem with this method. Consequently, physical separation of stones prior to the image analysis program described in this paper may be necessary for satisfactory discrimination. AS

Wheat flour

2834 Preston (KR). Effect of neutral salts of the lyotropic series on the physical dough properties of a Canadian red spring wheat flour. Cereal Chemistry 66(3); 1989; 144-148

The rheological studies carried out on a Canadian Red Spring wheat flour to find out the effect of the increasing concn. (0.05-1.0M) of sodium salts of the lyotropic series containing the anions such as Cl^{-1} , Br^{-1} , perchlorate^{-4}, I, showed that the dough strength increased at lower concn. of the salts (0.05-0.1M). The effect was more pronounced in the presence of chaotropic anions, SCN^{-1} & I^{-1} . But at higher concn. (0.5-1.0M), the dough strength properties decreased in the presence of chaotropic anions, where as it increased in the presence of non chaotropic anions, Cl^{-1} , Br^{-1}
The great differences in the effect of the anions on the rheological parameters studied reflects the important role of hydrophobic and electrostatic interactions in determining the physical dough properties of wheat flours. AS

Wheat proteins

Glutenin

2835 Kobrehel (K) and Alary (R). Isolation and partial characterisation of two low molecular weight durum wheat (Triticum durum) glutenins. Journal of the Science of Food and Agriculture 48(4); 1989; 441-452

2836 Marchylo (BA), Handel (KA) and Mellish (VJ). Fast horizontal sodium dodecyl sulphate, gradient polyacrylamide gel electrophoresis (SDSG PAGE) for rapid wheat cultivar identification and analysis of high weight glutenin subunits. Cereal Chemistry 66(3); 1989; 186-192

The fast horizontal SDSG-PAGE with silver staining in conjunction with the phast system was used to separate wheat storage proteins (gliadin and glutenins) and also for distinguishing wheat cvs. Out of 8-25% or 10-15% gradient phast gels the latter format gave the shortest analysis time of 45 min. electrophoesis and 44 min. staining. Only three groups of cvs. out of 70 such as seven in red spring two in white winter and two in red winter wheats were amenable to this technique. Similarly HMW glutenin subunits could be identified by this technique except for the subunits 2 and 5 and 1 and 2 were partially resolved. The overall advantage claimed are the effectiveness of this technique when smaller member of samples are analysed on an intermittent basis rather than daily analysis of large number of samples. AR

Wheat starch

2837 Seguchi(M) and Yamada (Y). Study of proteins extracted from the surface of wheat starch granules with sodium dodecyl sulphate. Cereal Chemistry 66(3); 1989; 193-196

Wheat prime starch granule surface proteins weree extracted with 1% sodium dodecyl sulphate (SDS) solution containing 1% 2-mercaptoethanol at room temp. without swelling and gelatinization of the starch granules. The extracted prime wheat starch granules showed no staining with amido black 10B, indicating no stainable proteins remained on the surface of the starch granules. SDS gel electrophoreis of the extracts stained with Coomassie brilliant blue R-250 and silver stain showed the pattern of the extracted surface protein bands. These protein bands were also subjected to periodic acid-Schiff and Sudan black staining; however, neither glycoproteins or lipoproteins were observed. A low mol. wt. band was observed in the gel and identified as lysophosphatidyl choline after electroextraction following thin-layer chromatography. After five successive extraction treatments of the same mixture, changes in the prime starch granules became apparent under observation with phase contrast microscopy. AS

MILLETS

Corn

2838 Esen (A). Immunological cross-reactivity among alpha-zeins of maize (Zea mays L.). Journal of Cereal Science 8(1); 1988; 93-109

2839 Kirby (AR), Ollett (A-L), Parker (R) and Smith (AC). An experimental study of screw configuration effects in the twin-screw extrusion-cooking of maize grits. Journal of Food Engineering 8(4); 1988; 247-272

In this paper the effects of screw configuration on the twin-screw extrusion cooking of maize grits has been described. For a set range of extrusion moisture contents and barrel temp. for each of four screw configurations of different conveying efficiencies the extrudate bulk density, water solubility and water absorption were measured. Results showed that screw configuration is a potent parameter in determining product properties it controls the specific mechanical energy input range and screw configurations of low conveying efficiency give rise to low viscosity melts which expand into low bulk density products. NGKR

2840 Sefa-Dedeh (S). Effects of particle size on some physicochemical characteristics of `agbelima' (cassava dough) and corn dough. Tropical Science 29(1); 1989; 21-32

The particle size of `agbelima' and corn dough affect the bulk density and functional characteristics of both the corn and the cassava samples. Brabender viscoamylograph characteristics such as pasting temp., viscosity at 95 C and on cooling will depend on how fine the product is. Fermentation of the corn sample greatly reduced its gelling characteristics but increased the initial gelatinization temp. Sensory evaluation on porridge made from corn dough of different particle size indicated that the consumer prefers timely ground samples. BV

Corn starch

2841 Chinnaswamy (R), Hanna (MA) and Zobel (HF). Microstructural, physicochemical and macromolecular changes in extrusion cooked and retrograded corn starch. Cereal Foods World 34(5); 1989; 415-422

Normal corn starch was extrusion-cooked at 140 C. The extrusion-cooked starch was either extrusion-cooked again or allowed to retrograde. The retrograded starch was then extrusion-cooked a second time. The expansion ratio dropped from 12.9 to 4.6 and the gas cell size and vol. of the expanded products also decreased considerably after retrogradation. Mosaic-like structures formed on the inner surfaces of the gas cells in the retrograded starch. Water solubility dropped from 28.7% to 4.7%. In contrast, the shear strength of the starch extrudates increased from 0.64 to 5.24 MPa after retrogradation. Differential Scanning Calorimetry (DSC) analysis showed a melting point of 54 C for retrograded starch, while there was no endotherm for the non-retrograded extrusion cooked starch. The crystalline form present in the retrograded starch sample was characterized by X-ray diffraction as "B" type. Gel Permeation Chromatography (GPC) separation showed degradation of starch mol. after extrusion-cooking. The degraded starch mol. reassociated and formed crystals in the retrograded samples, which then melted at the lower temp. of 54 C. The changes in water solubility, shear strength, and X-ray and DSC patterns were nullified or reverted when the retrograded starch was extrusion-cooked again. AS

Sorghum

2842 Dale (CI), Young (TW) and Makinde (A). Extruded sorghum as a brewing raw material. Journal of the Institute of Brewing 92(3); 1989; 157-164

The characteristics of wort and beer prepared based on extruded sorghum, extruded wheat and extruded barley as adjuncts (30%) were studied. Small scale mashes (50 g total grists) indicated that extruded sorghum up to 50% of the total grists produced worts of high extract yield and low viscosity and increasing the proportion resulted in decrease of wort filteration vol., total N and free amino N content. The worts characteristics prepared from sorghum extruded at 175 C were superior. Worts and beers produced on pilot brewery scale (100 L) from grist comprising 70% malt and 30% extruded adjuncts revealed that extruded sorghum was comparable to extruded wheat or barley, as well with malt wort and beer. Worts from extruded sorghum fermented quickly and the beer had sound flavours and reasonable stability behaviour. NGM

PULSES

2843 Geervani (P) and Umadevi . Effect of maturation on nutrient composition of selected vegetable legumes. Journal of the Science of Food and Agriculture 46(2); 1989; 243-248

Five legume vegetables harvested at the immature green and mature stages were analysed for wt. and nutrient comp. In some types the seed wt. increased up to seven-fold in the last 10 days of maturation. The protein, fat, carbohydrate and thiamin contents increased on maturation. However, the proportional increase varied widely from 10 to 100% in the case of protein and carbohydrates. The changes observed in the nutrient comp. and wt. of vegetable legume seeds in the last 10 days of maturation suggest that it is advantageous to harvest vegetable legumes when mature. AS

2844 Okolie (NP) and Ugochukwu (EN). Cyanide contents of some Nigerian legumes and the effect of simple processing. Food Chemistry 32(3); 1989; 209-216

This paper reports cyanide contents of legume seeds of var. of Phaseolus aureus, Vigna unguculata, Cajanus cajan and Canavalia gladialus frequently consumed in Nigeria and simple processing procedures in order to minimise HCN in bean based meals have been suggested. Results showed total cyanide contents of 381-1093, 285-1223 and 208-953 mg kg^{-1} dry wt. of intact seed, testa and cotyledons resp. with testa having 3-5 times higher HCN than cotyledons in some cases. It has also been seen that by soaking of seed in water for 24 h decreased HCN appreciably whole boiling for 3 h reduced by 49-95%. By soaking of beans in water and subsequent removal of testa prior to boiling HCN will decrease in bean meals. NGKR

Broad beans

2845 Senesi (E), Duranti (M), Gervasini (MG) and Rizzole (A). Nutritional and technological characteristics of new broad bean flaked products. Nahrung 32(5); 1988; 503-510

The effects of the technological processes (soaking in water or alkaline solutions, drying, puree preparation) and the supplementation with maize flour on the nutritional value and on the organoleptic characteristics of broad bean (Vicia faba L. major) flakes have been studied. Protein content was not affected by technological process. The addition of maize flour decreased the protein content of the final product depending on the amount of the maize flour added. Amino acid comp. showed a decrease of tryptophan due to technological processing, supplementation with maize flour improved the amino acid pattern and, except for tryptophan, the amount of essential amino acids in the flakes supplemented with 25% or more maize flour well compared with the provisional pattern by F.A.O. In vitro digestibility trials did not evidence significant changes due to technological processes or to integration of broad beans with maize flour. Broad bean toxic factors (vicine and convicine glycosides) were only slightly affected by the alkaline treatment of the flakes. Glycosides content decreased with the increasing supplementation with maize flour but the relationship was not linear. The organoleptic tests were positive for texture and taste, whereas the appearance of the products should be improved. AS

Cowpeas

2846 Ningsanond (S) and Ooraikul (B). Chemical and nutritional properties of dry and wet milling products of red cowpeas. Canadian Institute of Food Science and Technology Journal 22(2); 1989; 147-155

Red cowpea flour, and starch and protein fractions from dry and wet milling processes were evaluated for their chemical and nutritional quality. Red cowpea starch contained 24.2% amylose, slightly higher than mung bean starch with 21.2% amylose. Sugars in red cowpea flour from dry processing contained 3% stachyose, 2.1% raffinose, 1.9% sucrose, 0.5% glucose and 1.1% fructose, significantly higher than those in the flour from wet processing. Most of these sugars were collected in the protein fraction after air classification of dry-milled flour. Fatty acid profiles of dry- and wet-dehulled flour, protein fraction and protein isolate were similar. However, there were indications of changes in the lipids of wet-dehulled flour. Amino acid profiles of the cowpea flours and proteins produced with both techniques were also similar to one another having sulphur-containing amino acids as a limiting factor. SDS-PAGE showed prominent mol. wt. of red cowpea proteins to be between 45,000 and 65,000 daltons. Heat treatment in the wet extraction of cowpea protein appeared to cause dissociation, aggregation and denaturation of the protein, resulting in proteins of very low solubility and low biological quality. The pattern of solubility vs pH of red cowpea proteins from both wet-and dry-dehulled flours showed the isoelectric point at pH 4.4. Tannin content in red cowpea flours ranged from 3 to 4.5 mg/g samples, whereas the trypsin inhibitor content was between 3.8 and 15.6 TUI/mg samples. Trypsin inhibitor activity in the protein isolate was about 75% lower than that of the flour. PER of cowpea flours from both dry and wet dehulling was about 1.6-1.7, compared with 1.4 for whole seeds and 1.2 for protein isolate. Pressure cooking at 120 C for 20 min increased the PER of whole seeds to 2.1. These quality parameters indicated that for red cowpeas, dry processing generally produced products superior than those obtained from wet processing. AS

2847 Singh (US). Studies on the systemicity of (^{14}C) metalaxyl in cowpea (Vigna ungniculata (L). Walp.). Pesticide Science 25(2); 1989; 145-154

(^{14}C) metalaxyl applied to seeds, roots and leaves of cowpea, a grain and fodder legume highly succeptible to seed decay, was readily taken up by all plant parts and a major fraction of it was retained within the treated leaves and seed but not in the roots. The fungicide exhibited ambimobility inside the plant. When applied to the middle of the leaflets, metalaxyl mobilised towards proximal and distal parts of the leaflet. Intra-leaflet movement studied by autoradiography technique seemed to result from translocation through veins and diffusion through cell walls and intercellular spaces. Accumulation of metalaxyl at tips and margins of primary leaves followed application to roots. Metalaxyl was readily extracted from most plant parts except cotyledons and only 0.8% of the fungicide applied as a seed treatment was recovered from 50-day-old plants. (The radiolabelled metabolic products in plant extracts were separated using thin layer chromatography; plates were developed, autoradiographed and radioactive spots eluted and counted.). SGB

Lentils

2848 Bhatty (RS) and Slinkard (AE). Relationship between phytic acid and cooking quality in lentil. Canadian Institute of Food Science and Technology Journal 22(2); 1989; 137-142

Thirty six samples of Laird and Eston lentils grown in a three yr. cooperative test, on farmer's fields, and in a hydroponic exp. were used to determined shear force (cooking quality), seed phosphorus (P), phytic acid (PA, % by wt. and PA-P, PA % of P) and inorganic-P. The samples were divided into good-and poor cooking, having shear force values less or greater than 4.0 kg/g, 15.2%, 30.6% and 21.5% more P, PA-P, resp., than the 25 poor-cooking (P = 0.01). These differences were higher, being 15.6%, 36.9% and 25.2% for the five good-cooking and 23 poor cooking sample of lentil obtained from the cooperative test (P = 0.01). In the hydroponic exp., the differences between the good and poor-cooking samples for P, PA and PA-P were 10.5%, 19.5% and 10.2% resp. (non-significant). The data suggested that PA was largely, if not entirely responsible for the observed differences in the cooking quality of lentil. Thus, enhanced levels of available P, by conversion to PA, may improve the cooking quality of lentil. The ranges in 36 lentil samples were; shear force, 2.6 to 7.9 kg/g; P, 0.23 to 0.67%; PA, 0.15 to 1.54%; PA-P, 17.8 to 64.8%; inorganic P, 3.6 to 48.7%. AS

Mung beans

2849 Sinha (KK) and Kumari (P). Effect of ochratoxin A on some biochemical changes in seeds of mung bean (Vigna radiata, var Pusa 119). Journal of the Science of Food and Agriculture 48(4); 1989; 453-457

Studies on the effect of a range of concn. of ochratoxin A on some biochemical parameters viz chlorophyll, protein and nucleic acid concn. during seed germination and seedling growth were carried out in mung beans. (Vigna radiata (L) Wilezek, var. Pusa 119). By this treatment the levels of all the parameters resulted and the extent of reduction was directly proportional to the concn. of toxin application. NGKR

OILSEEDS AND NUTS

Coconuts

2850 Nijaguna (BT). Coconut dehusker. Journal of Food Engineering 8(4); 1988; 287-301

In this paper the work involved in the design development and testing of a coconut dehusker over coming the drawbacks of earlier designs has been reported. This is found to be simple study and efficient nine blade dehusker which is also financially beneficial to both producers and worker. Tests and assessment of this unit in both lab. and field with safety aspects proved its commercial feasibility as the unit is found to dehusk about 250 coconuts per h compared to only 75 nuts per h by the spike method of dehusking. This unit can be operated by unskilled labourers and costs about Rs. 2000/ and the payback period on the investment would be 4-5 yrs. NGKR

Kolanuts

2851 Ogunmoyela (OA). The use of steam blanching for preserving the quality of Kolanuts (Cola nitida). Food Chemistry 32(3); 1989; 163-170

In this paper the effectiveness of blanching as a technique for preventing the characteristics but undesirable browning, also high storage losses thereby preserving the original colour, texture and flavour of the kolanuts cola nitida has been studied. Kolanuts wholly embedded in their pods and in fresh condition were obtained from Cocoa Research Institute of Nigeria, Ibadan for these studies. Blanching exp. were carried out with steam treatment in an automatic pressure cooker at various temp. of 108.5 C 115.3 C and 121 C with corresponding pressure levels of 143.3 KN/m^2 , 169.1 KN/m^2 and 198.5 KN/m^2 The quality evaluation of blanched nuts for their most visible changes in wt. colour and texture were assessed by various methods. Results indicated that steam blanching was effective in controlling the enzymic process. Based on the results an optimum time temp. combination of 108.5 C for 10 S has been suggested to be suitable for polyphenolase enzyme inactivation during post harvest processing and preserving the qualities of kolanuts. NGKR

Macadamia

2852 Basker (D) and Kadman (A). Optimal salting of macadamia (Macadamia integrifolia) nuts. Journal of the Science of Food and Agriculture 46(2); 1989; 221-225

Roasted macadamia (Macadamia integrifolia Storey) nuts were salted at various levels up to 19 g kg^{-1} and presented to a taste panel. The results showed that the assessors could be divided into `salt dislikers' to whom perceived quality decreased linearly with increase in salt content, and salt likers, to whom perceived quality increased as the salt content increased. It follows that the nuts can be produced to suit these two market segments separately, or else a single lightly salted compromise product can be offered to both groups. AS

Rapeseeds

2853 Dedercq (DR) and Daun (JK). Determination of the total glucosinolate content in canola by reaction with thymol and sulphuric acid. Journal of the American Oil Chemists" Society 66(6); 1989; 788-791

Intact glucosinolates in seeds and meals of repeseed and canola var. were isolated and purified on small DEAE ion exchange columns. After eluting with potassium sulphate the glucosinolates were hydrolysed with sulphuric acid to produce this glucose which was determined as a complex with thymol. The method was compared to a gel procedure which determines aliphatic glucosinolates. MNK

2854 Lindh (LA) and Dahlen (JAH). Hydrogen sulphide and actaldehyde discharge from a rapeseed extraction plant. Journal of the American Oil Chemists" Society 66(7); 1989; 972-973

The gas effluent from a mineral oil recovery system in a rapeseed extraction plant contains high concn. of hydrogen sulphide and acetaldehyde. The two compounds are produced in the desolventiser-toaster (DT) and are the major cause of the unpleasant smell emanating from the plant. AS

Soybeans

2855 Borowska (J) and Kozlowska (H). The effect of coagulum washing on the quality of soybean and faba bean isolates. Nahrung 32(5); 1988; 455-460

Protein isolates of faba bean and soybean, obtained using waste effluents of potato as protein extrahent and water or 86% ethanol or 2% ascorbic acid for washing coagulum, were investigated. Both the use of 86% ethanol and 2% ascorbic acid lowered the solubility of isolates (approx. 1.7-11.9%) stronger protein denaturation being caused by ethanol. Although the use of waste effluents of potato increased trypsin inhibitors activity compared with the use of water, applying ethanol or ascorbic acid washing considerably lowered this activity. The use of 86% ethanol also caused an elimination of approx. 60% phytates from soybean isolates and a little less from faba bean ones. Ascorbic acid eliminated these undesirable compounds only to a small extent. In the case of 86% ethanol the organoleptic properties of isolates were found to have been improved. The isolates were of lighter colour and they were completely devoid of the leguminous taste. AS

2856 Clarkson (SP), Large (PJ) and Bamforth (CW). Purification of a cyanide-sensitive superoxide dismutase from soy beans. A food-compatible enzyme preparation. Journal of the Science of Food and Agriculture 48(1); 1989; 87-97

A method of purifying superoxide dismutase (SOD;EC 1.15.1.1), free from lipoxygenase (EC 1.13.11.12) and catalase (EC 1.11.1.6), from ethanol treated soybeans is described. Preparations with the highest activity were obtained from new season's beans. Although not homogeneous by electrophoretic analysis, the preparation was 300-fold purified. The enzyme has a mol. wt. of 36 300 and a subunit mol. wt of 18000. Its sensitivity to cyanide suggests that it is a typical cupro-size SOD. Isoelectric focusing showed the presence of three separate charged sp. with isoelectric points of pH 4.73 (the major sp.), 4.55 (the minor sp.), and 4.37. The enzyme withstands 45 min at 65 C without loss of activity, and losses only half its activity in 30 min at 75 C at pH values between 5 and 8. Severe losses in activity at pH 4 and below are observed at 75 C. The enzyme can be stabilised for storage at 4 C in 60% (v/v) glycerol. AS

2857 Dahmer (ML), Fleming (PD), Collins (GB) and Hildebrand (DF). A rapid screening technique for determining the lipid composition of soybean seeds. Journal of the American Oil Chemists" Society 66(4); 1989; 543-548

A rapid procedure of simultaneous extraction and transmethylation of lipids from soybean cotyledons at 90 C in mixture of hexane and 1% sulphuric acid in methanol has been developed. This direct transmethylation method is especially useful in breeding studies where large numbers of small samples are required to be analysed for fatty acid comp. MNK

Soy products

Soy milk

2858 Okubo (K), Kosugi (T), Honnma (T), rokukawa (K) and Yano (A). Protein composition of Yu (supernatant of coagulated soy milk) and preliminary protein recovery from Yu on tofu processing. Journal of Japanese Society of Food Science and Technology '(Nippon Shokuhin Kogyo Gakkaishi') 36(3); 1989; 231-236 (Ja).

A supernatant of coagulated soy milk obtained during Tofu processing have been termed Yu in Japanese, and have been main waste water of Tofu factory. Because Yu has been suggested to contain non-coagulated protein and sugars, the recovery of protein from Yu is expected to be effective for reduction of waste water facilities and the recovered protein should be utilized as food materials. Therefore, the yield, N content and protein comp. and its mol. wt. distribution on gel electrophoresis of the Yu solid were examined. Fractionation by gel filtration and ultrafiltration was also studied. As a result, into Yu moved 5.7% of soybean's solid materials, and the N content of the Yu solid was 5.1% (31.9% as protein). On a gel electrophoretical pattern at least 7 kinds of protein components were detected, of which main three components were deduced to have the mol. wt. of 55, 38 and 15.5 KD, resp. The gel electrophoretical pattern of Yu was quite different from that of a soybean whey fraction (supernatant fraction of isolated protein from defatted soybean meal) which have been investigated in detail. Yu was able to divide into protein and nonprotein fractions by gel filtration with a Bio gel P-30 or P-100 column, ultrafiltration with a 10 KD filter and dialysis with cellophane tube. Further, about 60% of the protein fraction was successfully recovered from waste Yu water of Tofu factory by dialysis and ultrafiltration. AS

2859 Thomas (R), deMan (JM) and deMan (L). Soy milk and tofu properties as influenced by soybean storage conditions. Journal of the American Oil Chemists" Society 66(6); 1989; 777-782

Soybeans were stored at two temp., 20 C and 30 C, and two relative humidities, 65% and 85%. The amount of protein extracted into soy milk decreased by about 14% of the initial extractability in all cases after eight months of storage. The decline in protein extractability could not be explained by decreases in pH, nor by loss of solubility of certain protein components. Tofu made from beans that were stored at 85% relative humidity became less uniform in microstructure toward the end of the storage period. The vol. of whey produced increased with bean storage time. AS

Soy sauce

2860 Nakadai (T) and Nasuno (S). Use of glutaminase for soy sauce made by koji or a preparation of proteases from Aspergillus oryzae. Journal of Fermentation Technology '(Hokko Kogaku Zasshi') 67(3); 1989; 158-162

In this paper the use of glutaminase for soy sauce made by koji or a preparation of proteases from Aspergillus oryzae has been described. It was seen that a large amount of glutamic acid was formed in such hydrolyzate or soy sauce made by the addition of mycelia of black Aspergilli or glutaminase from Cryptococcus albidus. The former effect was caused by glutaminase mainly produced by black Aspergilli. The former crude enzyme was found to show an optimum pH of 5.0, broad pH stability and salt tolerance. By addition of glutaminase from C. albidus ATCC 20293 in soy sauce manufacture using a preparation of proteases it was found to result in an increase of 42% in glutamic acid per total nitrogen content. NGKR

TUBERS AND VEGETABLES

Tubers

Cassava

Cassava flour

2861 Ijioma (BC), Ogbuehi (CRA), Okpokiri (AO) and Ukpabi (UJ). Production of protein enriched cassava fufu flour. Journal of Root Crops 14(2); 1988; 11-14

An enriched cassava fufu flour comparable in its acceptability to locally produced cassava fufu has been produced. Cassava fufu flour was blended with soy flour at various ratios to produce Blend A (1:1), Blend B (2:1), and Blend C (3:1). The protein content of the blends range from 12-22%. There were no significant differences in acceptability (P = 0.05) of fufu made from Blends B and C. Although Blend A has the highest protein content, it was the least acceptable due to its texture and colour. Results of this study shows that soybean can be used successfully in enriching cassava fufu meals. AS

Potatoes

2862 Booth (RH) and Rhoades (RE). An attempt to improve the storage of consumer potatoes on small farms in Peru. Tropical Science 29(1); 1989; 1-8

Reports the results of on-farm trials of the use of home-made pallet boxes and a chemical inhibitor to improve farmer practices for the storage of consumer potatoes. Post-harvest losses were reduced from 3.8% per month in traditional storage systems to 1.4% per month but no evidence of farmer acceptance was observed. Discusses the reason for non-adoption and the potential impact of farmer adoption on the national availability of potatoes. BV

2863 Hough (G), Alzamora (SM) and Chirife (J). Effect of piece shape and size on leaching of vitamin C during water blanching of potato. Journal of Food Engineering 8(4); 1988; 303-310

A mathematical model based on heat and mass transfer and enzyme destruction was used to predict the effect of shape and size on vitamin C retention during water blanching in forced convection and at 100 C of potato parallelepipeds (0.95 cm x 0.95 cm x variable dimension). The model predicted that increasing the variable dimension from 0.32 to 1.59 cm^2 produces a significant increase in vitamin C retention. This behaviour was confirmed by experimental results on water blanching of potatoes. AS

2864 Rice (P) and Gamble (MH). Modelling moisture loss during potato slice frying. International Journal of Food Science and Technology 24(2); 1989; 183-187

2865 Shetty (KK), Kochan (WJ) and Dwelle (RD). Use of heat-shrinkable plastic film to extend shelf life of `Russet Burbank' potatoes. HortScience 24(4); 1989; 643-646

Potatoes (Solanum tuberosum L.) were individually wrapped into different groups of heat shinkable plastic films and stored for 12 wks at RT (room temp.) i.e. at 24 C along with control (without wrapping). Lack of major changes in physico-chemical and physiological characteristics in the wrapped potatoes makes it convenient on suitable cheap technique at a retailers penel for maintaining quality of potatoes. BAP

Truffles

2866 Talou (T), Delmas (M) and Gaset (A). Analysis of headspace volatiles from entire black truffle (Tuber melanosporum). Journal of the Science of Food and Agriculture 48(1); 1989; 57-62

A dynamic headspace analysis is employed for isolating aroma volatiles directly from entire black truffles (Tuber melanosporum). The qualitative analysis is carried out by GC-MS. The formation of the major volatile compounds and their contribution to the final aroma impression is also discussed. AS

Yams

2867 Giami (SY). Effects of pretreatments on the sensory properties of plastain and yam on frozen storage. International Journal of Food Science and Technology 24(2); 1989; 195-197

Vegetables

2868 Rillaer (WV), Beernaert (H) and Dejonckheere (W). Headspace-gas chromatographic determination of inorganic bromide residues in vegetables. Zeitschrift fur Lebensmittel-Untersuchung und -Forschung 189(1); 1989; 21-25

This study describes a headspace GC method for the quantitative detn. of inorganic bromide in vegetables. Different parameters influencing the reaction of the bromide ion into 2-bromoethanol have been investigated. The analysis of 2-bromoethanol is performed by the headspace-electron capture-GC technique using a fused silica capillary. column CP wax 52 CB. Recoveries of 99.75% plus or minus 4.1% have been obtained for bromide concn. of 5 up to 350 mg/kg. Sixty-nine samples have been analysed by this method. The results are in good agreement with the normal bromide extraction method. The absolute detection limit is 2 ng corresponding to 0.5 mg Br^{-1} /kg for a slit ratio of 1:10. AS

Brocooli

2869 Makhlouf (J), Castaigne (F), Arull (J), Willemot (C) and Gosselin (A). Long-term storage of broccoli under controlled atmosphere. HortScience 24(4); 1989; 637-639

Controlled atm. (CA) conditions at 1 C were assessed for long term storage of Broccoli (Brassica oleracea L. Italica Group) under nitrogen and with different percentages of carbon dioxide and oxygen colour and chlorophyll retention was better under CA condition than in air upto 6 wks storage. After 6 wks undesirable odours and physiological injury occurred. Among the atm. tested 6% carbon dioxide and 2.5% of oxygen was found best for long term storage (> 3 wks) of Broccoli to maintain the quality without physiological injury. AS

Brussels sprouts

2870 Springett (MB) and Adams (JB). Identification of 1-cyano-2,3-epithiopropane in volatiles of a model system from Brussels sprout (Brassica oleraceae L. var. bullata subvar gemmifera DC). Journal of the Science of Food and Agriculture 46(2); 1989; 211-219

Volatiles produced in model systems consisting of crude enzyme preparation from Brussels sprouts (Brassica oleraceae L var bullata subvar gemmifera DC), sinigrin, ascorbic acid and 2-mercaptoethanol were investigated using GC-MS. 2-Propen-1-yl isothiocyanate was the only breakdown product of sinigrin in the absence of 2-mercaptoethanol but in its presence 1-cyano-2,3-epithiopropane and small amounts of 2-propen-1-yl cyanide also were formed. The identification of the 1-cyanol-2,3-epithiopropane was confirmed by comparison with a standard produced by autolysis of Crambe abyssinica L seed and with published mass spectra. The presence of 1-cyano-2,3-epithiopropane in volatile extracts of unblanched, frozen stored Brussels sprouts is also reported. AS

Leafy vegetables

Amaranth

2871 Vityakon (P) and Standal (BR). Oxalate in vegetable amaranth (Amaranthus gangeticus). Forms, contents, and their possible implications for human health. Journal of the Science of Food and Agriculture 48(4); 1989; 469-474

In this investigation forms of oxalate in Amaranthus gangeticus L. (a vegetable amaranth) grown in three sites with different soil and climatic factors were identified and determined quantitatively. On an av. it was found to be 9/g kg^{-1} on a dry wt. basis which is high from health point of view and two different fractions of oxalate in amaranth were isolated and these were found to be a fraction soluble in boiling water in the form of K and Mg oxalate and another to be on associated insoluble residue which was mostly Ca oxalate. Suggestions were made to carry out research on reducing the oxalate content of amaranth as most of the Ca in amaranth is unlikely to be available to the body and they can also interefer with Ca availability from other food sources. NGKR

Cabbages

2872 Karovicova (J), Polonsky (J) and Drdak (M). Utilization of capillary isotochophoresis during fermentation of cabbage. Nahrung 32(5); 1988; 519-520

Melons

Pumpkins

2873 Barber (L), Ibiama (EA) and Achinewhu (SC). Microorganisms associated with fermented fluted pumpkin seeds (Telferia accidentalis). International Journal of Food Science and Technology 24(2); 1989; 189-193

FRUITS

2874 Bicchi (C), Belliardo (F), Cantamessa (L), Gasparini (G), Icardi (M) and Sesia (E). Simultaneous determination of benzimidazole fungicides by HPLC on apples, pears and their pulps. Pesticide Science 25(4); 1989; 355-360

The simultaneous HPLC detn. of carbendazim, thiabendazole and thiophanate-methyl in apples, pears and their pulps is described. The method is based on a clean-up procedure carried out on an Extrelut 20 cartridge followed by HPLC analysis on a Diol column using hexane + isopropanol as mobile phase. Average recoveries of 83.8% for carbendazim, 82.9% for thiabendazole and 68.8% for thiophanate-methyl on apple matrix were obtained; recoveries on pear matrix were in the same range. Detection limits with UV detection at 285 nm of 100 ng ml^{-1} for carbendazim, 140 ng ml^{-1} for thiabendazole and 500 ng ml^{-1} for thiophanate-methyl were achieved. AS

2875 Donahaye (E) and Navarro (S). Sensitivity of two dried fruit pests to methyl bromide alone, and in combination with carbon dioxide or under reduced pressure. Tropical Science 29(1); 1989; 9-14

The influence of 20% carbon dioxide and low pressure (13 300 Pa/100 mmHg) on the sensitivity of two dried fruit pests to methyl bromide (MB) was studied. Lab. fumigations for up to 18 h of eggs, larvae, pupae and adults of two sp. of Carpophilus (Coleoptera:Nitidulidae) revealed differences in sensitization between the treatments and between insect sp. and stages. For C. hemipterus max. sensitization to MB by carbon dioxide was x 3.1 for 18 h exposure to adults while max. sensitization by low pressure was x 2.1 (for eggs). For C. mutilatus max. sensitization to MB by carbon dioxide was X 2.3 (for adults). At short exposure, differences in sensitization were marginal, while for 6 and 18 h fumigation, 20% carbon dioxide was generally more effective than low pressure. AS

Actinidia

2876 Kola (J) and Pavelka (J). New varieties of Actinidia kolomikta - one of the richest sources of vitamin C. Nahrung 32(5); 1988; 513-515

Bananas

2877 Ramaswamy (H-S) and Tung (MA). Textural changes as related to colour of ripening bananas. International Journal of Food Science and Technology 24(2); 1989; 217-221

Textural properties of ripening bananas correlated with their peel colour. A simple physical texture measurement during bulk storage could be a useful technique for a better prediction of banana maturity for retail market. BV

Mangoes

2878 Bouler (M), Arul (J), Verret (P) and Kane (O). Induced resistance of stored mango (Mangifera indica L.) fruits to mold injection by treatment with Colletotrichum gloesporiodies L. cell-wall hydrolysate (Oligosaccharides). Canadian Institute of Food Science and Technology Journal 22(2); 1989; 161-164

Healthy mature green mango fruits and physiologically injured fruits-by exposure to 4 C (cold injury)- were treated by infiltration with a solution of potential phytoalexin elicitor and were then stored in an environment favourable to mold development, i.e. 24 C and 100% R.H. The elicitor was a mixture of oligosaccharides prepared by acid hydrolysis of cell walls of Colletotrichum gloesporioides L.. The mold infection indices were significantly lower (p = 0.01) with the treated healthy fruits than with the untreated control fruits, indicating a greater mold inhibition. Cold injured fruits did not respond to the elicitor treatment because the metabolic activity (enzyme synthesis) which is required for the synthesis phytoalexins was not functioning. Mango fruits which had been treated with the elicitor before exposure to cold temp., showed mold inhibition when later warmed to 24 C, suggesting that phytoalexins accumulated before physiological injury, was not catabolyzed by the diseased tissues. AS

Papayas

2879 Narinesingh (D) and Mohammed-Maraj (R). Solar drying characteristics of papaya (Carica papaya) latex. Journal of the Science of Food and

Agriculture 46(2); 1989; 175-186

Dripped, congealed and a mixture of dripped and congealed papaya latexes of varying charge sizes were dried in a rock-bed solar dryer over a temp. range of 40-60 C. The time taken for the fresh latex to dry from an initial moisture content of between 73 and 80% (wet basis) to an equilibrium moisture content of between 6 and 8% varied from about 1.5 to 36 h depending upon the charge size. The latex, whether dripped or congealed, dried as pale yellow flakes which could easily be powdered and had a proteolytic activity slightly higher than that of the fresh latex. AS

Prunes

2880 Weitz (DA), Lara (MA), Piacentini (RD) and Feldman (S). Dipping treatment effects on simulated prune solar drying. Canadian Institute of Food Science and Technology Journal 22(2); 1989; 133-136

Experiments on prune drying with different surface treatments were carried out. Air temp., relative humidity and velocity conditions, characteristic of solar multishelf batch driers in a hot temp., humid climate region were employed. Dipping prunes in 4% methyl oleate was the most effective treatment because of the faster drying rate attained and the better appearance of the final product. An interesting alternative is the employment of olive oil potassium carbonate emulsions as they are less expensive and can be easily obtained. AS

Squash

2881 McCollum (TG). Physicological changes in yellow summer squash at chilling and non-chilling temperatures. HortScience 24(4); 1989; 633-635

Results of this study confirms the previous reports of the sensitivity of summer squash fruit to chilling injury (CI) and provide additional information with physiological changes that take place in response to chilling. An increase in the rate of water loss and ethylene upon transfer to non-chilling temp. was observed but the electrolyte leakage was unaffected by chilling temp. BAP

CONFECTIONERY, STARCH AND SUGAR

Confectionery

2882 Serpelloni (M). Sugarless confectionery-using sorbitol, mannitol and lycasin. Confectionery Production 54(7); 1988; 418-420, 424

Chocolates

2883 Hogenbirk (G). Viscosity and yield value for chocolate and coatings what they mean and how to influence them. Confectionery Production

54(8); 1988; 456-457, 478

The diffusions of Newtonian and non-Newtonian fluids are given. Chocolate and coatings belong to non-newtonian type. For the chocolate and coating manufacture, the viscosity means matter of great concern, which influence the flow properties and thickness of coatings. The influence of quantity and quality of and sugars, on viscosity of chocolate and coatings are briefly described. SYR

2884 Markov (E) and Tscheuschner (H-D). Examination of the texture of chocolate (III). Lebensmittelindustrie 35(5); 1988; 228-231

Cocoa

2885 De Smedt (J). Avoiding Salmonella problems. Microbial GMPs. Manufacturing Confectioner 69(1); 1989; 72-75

Cocoa beans contain salmonella, but other raw materials including milk powder, dried eggs, coconut and gelatin may also be contaminated. The measures to take during the production of chocolate and confectionery in order to avoid and eliminate Salmonella contaminated are described. Four steps can be distinguished in the Hazard Analysis Critical Control Point (HACCP) system; Lazard analysis , identification of Critical Control Points (CCP's) , monitoring CCP's with effective control measures and implementation of appropriate and immediate action. SYR

BAKERY PRODUCTS

2886 Harinder (K) and Bains (GS). Studies on baking of high alpha-amylase flours. Effect of pH, salt and L-cysteine HCl in the dough. Nahrung 32(5); 1988; 481-490

The effect of varying concn. of sodium chloride (0 to 2.5%), pH (5.8 to 4.2) and potassium bromate (75 p.p.m.) with and without addition of L-cysteine. HCl (25 to 75 p.p.m.) on the baking of flours with high content of alpha amylase (108 to 540 SKB/100 g) was compared with a normal flour. Decreasing the pH of dough to 4.2 and increasing the salt concn. to 25% reduced the loaf vol. and gluten recoveries considerably. Decreased pH also reduced the mixing tolerance of dough, which was counteracted by increased salt content of normal and high alpha-amylase flours. A combination of low pH, salt and L-cysteine. HCl and 75 p.p.m. of potassium bromate without sugar in the dough of higher alpha-amylase flour produced a satisfactory loaf by eliminating bulk fermentation. AS

2887 Jasberg (BK), Michael Gould (J) and Warner (K). High-fibre, non caloric flour substitute for baked foods. Alkaline peroxide treated lignocellulose in chocolate cake. Cereal Chemistry 66(3); 1989; 209-213

Wheat straw was treated with hydrogen peroxide at pH 11.5, resulting in a partially delignified, highly water-absorbent and swellable fiber fraction that was used as partial replacement (2-50%) for flour in layer cakes. Vol. of cakes prepared with less than 30% replacement of flour increased by 5 to 10% compared with controls. Taste panel flavour and texture scores indicated that cakes with as much as 40% of the flour removed were not significantly different from the control cake. The presence of alkaline peroxide-treated wheat straw allowed additional water to be added without reduction of cake vol. The data indicate that peroxide-treated lignocellulosics may be used as a noncaloric, high-fiber substitute for a portion of the flour in cakes without introducing undesirable sensory characteristics or causing deterioration of baking performance. AS

2888 Jasberg (BK), Michael Gould (J), Warner (K) and Navickis (LL). High fibre, non caloric flour substitute for baked foods. Effects of alkaline peroxide treated legnocellulose on dough properties. Cereal Chemistry 66(3); 1989; 205-209

Replacing up to 30% of the flour in a dough with alkaline hydrogen peroxide (AHP)-treated lignocellulose increased the height of the mixograph peak obtained during dough mixing by as much as 40% compared with an all flour dough. Substantially more water could be incorporated into the dough integrity when AHP-treated lignocellulose was used as a replacement for a portion of the flour. Loaf vol. of white bread were essentially unchanged when 10% of the flour was replaced with AHP-treated lignocellulose without added gluten. AS

2889 Michael Gould (J), Jasberg (BK), Dexter (LB), Hsu(JT), Lewis (SM) and Fahey (JRGC). High fibre, non caloric flour substitute for baked foods. Properties of alkaline peroxide treated lignocellulose. Cereal Chemistry 66(3); 1989; 201-205

Treatment of lignocellulosic materials such as wheat straw, corn stalks, cereal brans, or vegetable and fruit pulps with an alkaline (pH 11.5) solution of hydrogen peroxide dramatically increased their ability to absorb water, soften, and swell when hydrated. Substitution of alkaline hydrogen peroxide treated lignocellulose for cornstarch-dextrose mixtures in the diets of nonruminant animals (rats, chicks) reduced the digestibility of the diets without increasing the amount of feed consumed. As a results, the rate and efficiency of wt. gain were reduced for animals consuming the diets containing treated lignocellulose. The low digestibility of alkaline peroxide-treated lignocellulose by nonruminants, in conjunction with its enhanced physical properties compared with other cellulosic ingredients for baked foods, suggests that this material may be useful as an ingredient for reducing caloric density and/or increasing dietary fiber content of baked products. AS

Bread

2890 Barber (S), Jose Torner (M), Martinez-Anaya (MA) and De Barber (CB). Microflora of the sour dough of wheat flour bread. IX. Biochemical characteristics and baking performance of wheat doughs elaborated with mixtures of pure microorganisms. Zeitschrift fur Lebensmittel-

Untersuchung und -Forschung 189(1); 1989; 6-11

Changes in mono- and disaccharides and acetic and lactic acid production of 6 different straight doughs elaborated with combinations of pure strains of yeasts Saccharomyces cerevisiae and Candida boidinii and lactic acid bacteria Lactobacillus plantarum and Streptococcus sp. have been investigated, as well as the baking quality of the resulting breads. The type and proportion of the fermentative microorganisms were found to influence the biochemical activity of the doughs. The sugar levels after mixing reached different proportions, depending on the type of sugar and the type of microorganisms used. After proofing, the glucose and fructose content of the doughs decreased to 0.01%-0.02% db and maltose decreased to 0.45%-0.11% db. Acetic and lactic acids underwent variable changes during fermentation, depending on the type of dough. Lactic acid showed higher levels than acetic acid. Bread made from these doughs had different sensory characteristics, texture, edibility and overall acceptance, as well as different lactic acid and acetic acid contents, depending on the mixture of microorganisms inoculated. AS

2891 De Barber (CB), Collar (C), Prieto (JA) and Barber (S). Chemical changes in nitrogenous compounds during fermentation of sour doughs and bread doughs. Zeitschrift fur Lebensmittel-Untersuchung und -Forschung 189(1); 1989; 12-15

The evolution of sour doughs (SD), prepared using a wheat bran extract as the starting material, and their respective bread doughs (BD) has been investigated by determining the chemical changes which take place in 0.85 mol/L NaCl-soluble nitrogen compounds during fermentation. The quantitative changes determined are: total N content (TN), primary amine N (AN) and alpha-amine N of free amino acids (AAN) in the total soluble fraction (SN), protein (PSN) and non-protein (NPSN) subfractions. During fermentation, alpha-amine N of the free amino acids (AAN_{SN}) and peptides (AN_{NPSN} - AAN_{SN}), increase in SD and decrease in BD. Changes are larger and faster in peptide N and even larger during the third and fifth steps. The total protein content (TN_{PSN}) decrease in both SD and BD. Results are discussed in relation to the quality of the bread obtained in each case. AS

2892 Lai (CS), Davis (AB) and Hoseney (RC). Production of whole wheat bread with good loaf volume. Cereal Chemistry 66(3); 1989; 224-227

A good quality reconstituted whole wheat bread containing 16.3% bran and 12.7% shorts having a loaf vol. equal to the control was obtained by including either indigenous lipoxygenase or enzyme active soy a flour to oxidise the glutathione from the serm pre soaking of the non flour milling fractions and using optimum water absorption (must short for excessively sticky dough). A number of yeast spang was needed when lipoxygenase was used and this stage could be eliminated when high levels (3%) of enzyme active soy flour was included in the formulations. Certain salts (1.4% sodium citrate or 1.2% sodium phosphate, dibasic) and surfactants (0.5% SSL, or 0.5% MG or 0.5% lecithin etc) improved the loaf vol. Compressed yeast was found superior to instant dry yeast for maintaining constant bread quality. AR

2893 Lai (CS), Hoseney (RC) and Davis (AB). Effects of wheat bran in breadmaking. Cereal Chemistry 66(3); 1989; 217-219

Wheat bran, a by-product of wheat milling is more deterimental to loaf vol. of white pan bread than it is expected to be due to simple dilution of gluten proteins. It appears to be a function of bran water interaction. The deterimental effect of bran could be over come by fine grainding presoaking and including sodium stearyol lactylate upto 2% level. The presoaked bran contentd could be incorporated upto 22% level and still produce a loaf vol. with significantly above the vol. of a control loaf of bread. Also upto 6% of additional water could be included during preparing the dough. AR

2894 Lai (CS), Hoseney (RC) and Davis (AB). Functional effects of shorts in breadmaking. Cereal Chemistry 66(3); 1989; 220-223

Shorts, a by-product of wheat milling has a specific, detrimental effect on loaf vol. of bread. This is related to interaction between lipoxygenase, glutathione, and a methoxy (hydroquinone (MHB) type of compounds, the evidence for the interaction of these three entities is presented. By modification of the canventional breadmaking process to include lipoxygenase (0.001% as flour wt.) in a non yeast sponge. The detrimental effect of glutathione-MHQ could be eliminated. But by pre soaking the shorts and its use upto 11% totaly removed the deletering effect when lipoxygenase is also included in the formulations. AR

2895 Qarooni (J), Miskelly (d) and Wootton (M). Factors affecting the quality of Arabic bread. Fermentation variables. Journal of the Science of Food and Agriculture 48(1); 1989; 99-109

The results of this study showed that the finished dough temp., fermentation time, and intermediate and final profing time influence on the quality of Arabic bread, sometimes in several ways. Final proof time and its effect with dough temp. on various aspects of bread quality were most significant. Longer final proof time led to the formation of blister-free bread, improvement in crust smoothness, evenness of layers, grain appearance, uniformity and crumb texture although crust and crumb colour were darker. BV

Cakes

2896 Johnson (JM) and Harris (CH). Effects of acidulants in controlling browning in cakes prepared with 100% high-fructose corn syrup or sucrose. Cereal Chemistry 66(3); 1989; 158-161

Cakes were prepared using 100% high fructose corn syrup (HFCS) or 100% sucrose and with two different acidulants in the leaving systems either cream or tartar(COT) or glucono-delta-lactone (GDL) to control browning. The acidulants greatly reduced 5-hydroxymethyl furfural and total browing in cakes prepared with 100% HFCS as a replacement for sucrose. GDL was more effective in controlling the browning than COT and also resulted in a more tender and moist cake. The inclusion of acidulants also reduced the loss of lysine. The sensory analysis on cakes with 100% HFCS and no acidulant, 100% HFCS with COT, and 100% sucrose with COT showed that these were less tender than other cakes and had more bitter than sweet aftertaste. AR

2897 Johnson (JM), Harris (CH) and Barbeau (WE). Effects of high fructose corn syrup replacement for sucrose on browning, starch gelatinisation, and sensory characteristics of cakes. Cereal Chemistry 66(3); 1989; 155-157

White layer cakes were prepared replacing sucrose with 0, 50, 75m and 100% high-fructose corn syrup (HFCS) with and without an acidulant to control browning. Cakes were evaluated for pH changes, total browning, 5-hydroxymethylfurfural content (HMF), onset of starch gelatinization of cake batters, and sensory characteristics. Total browning and HMF results indicated that the addition of an acidulant to the HFCS cake batters controlled excessive browning. Increased levels of HFCS lowered the onset temp. for starch gelatinization and resulted in a lower vol. cake. Sensory analysis of cakes prepared with varying levels of HFCS and an acidulant did not show significant differences from the control (100% sucrose) cake for colour, tenderness, or flavour. AS

Cookies

2898 Arndt (EA) and Wehling (RL). Evaluation of sweetener syrups derived from whey as replacements for sucrose in sugar snap cookies. Cereal Foods World 34(5); 1989; 423-428

Hydrolyzed lactose syrup (HLS), hydrolyzed-isomerized lactose syrup (HILS), and high fructose corn sweetener (HFCS) were substituted for 10%, 30%, or 50% of the sucrose (on a solids basis) in sugar-snap cookies. HLS was produced from cheese whey ultrafiltration (UF) permeate by treatment with immobilized beta-galactosidase, deionization, and evaporation to 62.1% total solids. HILS was produced from hydrolyzed. Deionized UF permeate by treatment with immobilized glucose isomerase and evaporation to 60.9% total solids. Cookie dough manageability decreased as the level of syrup substitution increased. Cookies containing syrup were significantly darker than control cookies (sucrose only) ($P < 0.05$). As the syrup level was increased, the cookie width/thickness (w/t) ratio decreased significantly and cookie softness increased. Control cookies were rated the highest for organoleptic quality as compared to cookies containing 10 or 30% syrup; however, cookies that contained syrup at these levels received satisfactory ratings. There were no significant differences among cookies containing HFCS and those containing the sweeteners derived from whey. AS

Crackers

2899 WU (JY) and Hoseney (RC). Rheological changes in cracker sponges during an 18-hour fermentation. Cereal Chemistry 66(3); 1989; 182-185

The pH of cracker sponges was the most effective parameter influencing the resistance to extension. This effect was attributed to the proteolytic enzymes of the flour; which have a pH optimum of 3.8 -4.1, for decreasing the resistance to extension. A mixture of commercial gluten and wheat starch an constant levels were used for studying the effect of proteolytic enzymes. The relative enzyme activities were determined from the slope of linear relationship between resistance to extension and time. The results showed that sponges at pH 4.1 and 3.5 had much greater enzyme activity than at pH 4.7 and 2.7. Reconstituting a constant residue with enzyme extracts from different flours indicated that the enzyme activity differed in different flours. AR

Dough

2900 Tait (SPC) and Galliard (T). Oxidation of linoleic acid in doughs and aqueous suspensions of wholemeal flours. Effects of storage. Journal of Cereal Science 8(1); 1988; 55-67

The production of oxidised lipids from linoleic acid in doughs and aqueous suspensions of wholemeal flour has been studied in relation to the duration of flour storage between milling and analysis. Production of oxidised lipids occurred rapidly upon hydration, and the capacity of the flour to generate these species. increased linearly with the time of storage at + 20 C. Monohydroperoxy octadecadienoic acid (MHPA), monohydroxy octadecadienoic acid (MHA) and trihydroxy octadecenoic acid (THA) were identified as the major oxidation products formed, and storage time affected the relative proportions of these three species. MHA and THA were the major products observed on hydration of flours that had been stored for short periods, but longer storage times resulted in MHPA forming a greater proportion of total oxidised lipid. For flours stored for prolonged periods, MHPA was the predominant oxidation product in the hydrated material. Mixtures of salt, yeast and L-ascorbic acid with flour at concn. typically used in bread recipes had no effect on either the amount or relative proportions of lipid oxidation products formed; higher concn. of L-ascorbic acid and yeast partly inhibited lipid peroxidation. AS

MILK AND DAIRY PRODUCTS

2901 Kozak (TJ). Regulatory response to the problem of pathogenic bacteria in the dairy industry. Journal of Dairy Science 71(10); 1988; 2817-2819

Response of FDA to control outbreaks of yersiniosis, listeriosis and salmenellosis is described. Increased surveillance at Federal State and Factory level followed by checking of pasteurization plant system reviews, and equipment reviews and training of handlers indicated presence of pathogens in various products from 6.9% plants, 2.9% of these plants products had Listeria sp. 3.2% non pathogenic Yerisinia; and 8% contained other organisms. JSS

2902 Rose (AS), Bankes (P) and Stringer (MF). Detection of Staphylococcal enterotoxins in dairy products by the reversed passive latex agglutination (SET-RPLA) kit. International Journal of Food Microbiology 8(1); 1989; 65-72

The SET-RPLA is a commercially available kit for the detection of staphyloccal enterotoxins in foods. Previous reports have shown that non-specific reactions occur on use of the kit with cheeses and thereby restrict its use. In this study a var. of dairy products were tested and non-specific reactions were found to be associated only with those products rennetted during manufacture. These reaction can be obviated by addition of 10 mM sodium hexametaphosphate to the diluent provided in the kit, without affecting the ability to detect staphylococcal enterotoxins in dairy products. The sensitivity of the SET-RPLA was demonstrated to be 0.25 ng/ml. AS

Milk

2903 Banks (W), Clapperton (JL) and Girdler (AK). Fractional melting of hydrogenated milk fat. Journal of Dairy Research 56(2); 1989; 265-273

Hydrogenated milk fats have been subjected to a process of fractional melting. In five of the six samples, the procedure yielded two fractions defused as oil/upper solid and lower solid fractions, whilst in the remaining sample, three fractions (oil, upper solid and lower solid) were obtained. The oil and oil/upper solid fractions were rich in short-chain fatty acid (FA) (4:0 and 6:0), whereas the lower solid fractions contained large amounts of long-chain FA (16:0 and 18:0). Triglyceride distributions reflected these differences in FA comp., the oil and oil/upper solid fractions being dominated by triglycerides with carbon numbers (CN) 36-38; the dominant CN for the lower solid fraction was 48-54. Melting spectra, obtained using differential scanning calorimetry, showed that the ability of the fractionation procedure to separate on the basis of melting properties ranged from excellent to relatively poor, depending on the type of milk fat. AS

2904 Banks (W), Clapperton (JL), Girdler (AK) and Steele (W). Fractionation of hydrogenated milk fat using thin layer chromatography. Journal of the Science of Food and Agriculture 48(4); 1989; 495-505

This paper reports the nature of the fractions obtained by TLC on silica gel using hydrogenated milk fats as the starting materials. Three distinct bands resulted in each case. Fatty acid and triglyceride analyses showed that fraction I was composed of high mol. wt. material whereas fraction III was of low mol. wt. and virtually all the triglycerides contained 4:0 or 6:0 fatty acids. The mol. wt.

range of fraction II overlapped those of fractions I and III and the reasons for its forming a distinct band remain obscure. It was seen hydrogenation markedly increased the heat of melting of the milk fat but values of heat of melting were approx. constant across the three fractions. NGKR

2905 Foster (CL), Britten (M) and Green (ML). A model heat exchange apparatus for the investigation of fouling of stainless steel surfaces by milk. I. Deposit formation at 100 C. Journal of Dairy Research 56(2); 1989; 201-209

A model heat-exchange apparatus was used to investigate the factors affecting deposit formation from milk on a stainless steel surface at 100 C. The structure and composition of the doposits were determined by scanning electron microscopy, energy-dispersive x-ray spectroscopy and chemical analysis after solution in alkali. The effects of changing the pH, preheating and skimming of the milk were similar to those observed in a small scale continuous ultra high temp. plant. The time course of deposit formation showed that a lag phase did not occur, but the deposit which formed after more than 45 min was more porous than that formed after shorter times. Most (50-90%) of the fresh deposit was readily removed by sonication, leaving a sublayer richer in minerals than the original. A dease, highly mineral-contaning sublayer forms first and is overlaid by a moreospongy, proteinaceous layer. More proteins than minerals get removed by sonication which could be due to poor adherence of high-protein areas to the surface. MCV

2906 Jimenez-Flores (R) and Richardson (T). Genetic engineering of the caseins to modify the behaviour of milk during processing. A review. Journal of Dairy Science 71(10); 1988; 2640-2654

Attempt is made to rationalize a basis for genetic engineering of the milk system to alter its functional characteristics. Appropriate changes in the milk proteins can lead to improvement in existing products and development of new products. JSS

2907 Pettersson (H), Holmberg (T), Larsson (K) and Kaspersson (A). Aflatoxins in acid-treated grain in Sweden and occurrance of aflatoxin M_1 in milk. Journal of the Science of Food and Agriculture 48(4); 1989; 411-420

A survey of aflatoxin in acid-treated grain and milk from farms using such grain was conducted in Sweden during 1986. Aflatoxins occurred most frequently (40%) in grain treated with a new formula of diluted (700 g l^{-1}) aqueous formic acid, but also in 31% of the samples of grain treated with 850 l^{-1} aqueous formic acid. The lowest incidence was found in grain treated with propionic acid, where aflatoxins were found in only one sample (3%). Aspergillus flavus/A. parasiticus occurred in the same manner, but were more frequent than the aflatoxins. When cultivated and aflatoxin producing agar, positive reactions were more common (56%) among strains originating from grain treated with formic acid than among strains originating from grain treated with propionic acid (4%). Aflatoxin M_1 in concn.

over 50 ng kg^{-1} was mainly found in milk from farms using formic acid, and in most of these cases aflatoxins were also detected in the grain samples. In some cases, milk from a single farm was contaminated enough to generate consumption milk from the dairy with aflatoxin M_1 concn. above or close to 50 ng kg^{-1}. The risk of aflatoxin formation after inadequate treatment of grain with formic acid is very high and is considerably lower with propionic acid. Formic acid has now been prohibited for use as a preservative of high moisture grain in Sweden. AS

2908 Pouliot (Y), Boulet (M) and Paquin (P). Observation on the heat-induced salt balance changes in milk. I. Effect of heating time between 4 and 90 C. Journal of Dairy Research 56(2); 1989; 185-192

Milk permeate was separated at various temp. by means of a hollow fibre ultrafiltration unit coupled to a stainless steel heat exchanger. Milk samples conditioned at 4 C were heated to 20, 40, 60, 80, 85 or 90 C prior to ultrafiltration. Ca, P, Mg, Na, K and citrate concn. were measured in the permeate samples. Ca and P contents of the permeate decreased as the temp. increased. The pH was measured after cooling the permeate to room temp. Smaller losses of Mg and citrate were also observed with increase in temp. Na and K levels were not affected. A two-step time-concn. relationship was apparent for the sp. under study. An initial sharp decrease in concn. occurred in the first minute holding time and was followed by a slower reaction. The possible occurrance of a two-step mechanism in the heat-induced salt balance changes is discussed. Dicalcium phosphate precipitation is believed to be coupled with tricalcium citrate precipitation upon heating. AS

2909 Pouliot (Y), Boulet (M) and Paquin (P). Observation on the heat-induced salt balance changes in milk. II. Reversibility on cooling. Journal of Dairy Research 56(2); 1989; 193-199

Milk which had been heated to 85 C for 40 min was examined for changes to milk salts taking place upon cooling to 4, 20, 40 and 60 C. The time-concn. curves showed a two-step reaction for Ca, P, and pH. The effect of the heat treatment in milk heated to 85 C for 40 min was to produce greater changes in the second step of the reaction. Because of the variability of the results for other sp. (Mg and citrate), the reversibility was calculated only for Ca and P. It was 90-95% and 93-99% resp. depending on the cooling temp. The reversibility of the heat-induced changes and especially of the possible dissolution equilibrium between Ca phosphate and citrate precipitates on cooling are discussed. AS

2910 Vasavada (PC). Pathogenic bacteria in milk. A review. Journal of Dairy Science 71(10); 1988; 2809-2816

The paper reviews newly emerging milk borne pathogens. These organisms are unique in several ways 1) not reported earlier, 2) careless handling of milk products processing, 3) failure of quality control in monitoring, 4) lack of information on newer pathogens. The pathogens discussed are Listeria monocytogenes, Compylobacter jejuni, Yersinia enterocolitica, and enteropathogenic Escherichia coli. JSS

Milk products

Cheese

2911 Gomez (R), Pelaez (C) and Delatorre (E). Microbiological study of semi-hard goat's milk cheese (majorero). International Journal of Food Science and Technology 24(2); 1989; 147-151

The development of microbial flora in industrially produced semi-hard cheese made from pasteurized goat's milk was studied during manufacture and over a 90-day ripening period. Estimates of total count, streptococci, lactobacilli, leuconostocs, coliforms, micrococci and staphylococci, Staphylococcus aureus and yeasts and moulds were carried out at various stages of the ripening process; Streptococci and lactobacilli were identified by sp. Initially, the total count increased rapidly, primarily as a result of the growth of mesophilic lactic streptococi mainly Streptococcus lactis and Strep. cremoris. Subsequently, both these counts stabilized or decreased. Lactobacilli increased, and by the end of the ripening period were the predominant microorganisms. Most common were Lactobacillus casei var. casei., especially at the end of storage; L. caseirav, rhamnosus, L. casei var. plantarum and L. cellobiosus were also isolated. Leuconostocs were not found in any of the cheeses, and hence no eye formation took place. Coliforms, enterococci, yeasts and moulds remained below $10^2 - 10^3$ c.f.u. g^{-1}. Max. levels of micrococci and staphylococci were found after 15-30 days of ripening and decreased gradually towards the end of the ripening period. Neither the milk curd, nor cheese contained Staph. aureus. AS

2912 Nunez (M), Medina (M) and Gaya (P). Ewes' milk cheese. Technology, microbiology and chemistry. Journal of Dairy Research 56(2); 1989; 303-321

A review article discussing important aspects of cheese industry in relation to Ewes' milk cheese. The aspects covered are, composition and microflora of Ewes' milk and its detection from other sp., main cheese types, behaviour of pathogens in cheese and future thoughts. MCV

2913 Riddle-Lawrence (S) and Hicks (CL). Effect of curd healing time on stirred curd cheese yield. Journal of Dairy Science 71(10); 1988; 2611-2617

Cheese was manufactured with variable heal times to determine the effect of curd healing time on stirred curd cheese yield. A randomized complete block design with three treatments (vat healing times from cut to cook) was replicated six and four times in studies 1 and 2, resp., for a total of 30 vats of stirred curd cheese. In study 1, heal times of 15, 22, and 29 min were used in manufacturing cheese. Curd was not healed 15 or 30 min in study 2. Cooking curd immediately after cutting resulted in significantly lower moisture content in cheese, lower raw cheese yields, and higher fat loss into whey. Healing cheese curd 15 min or longer decreased syneresis, resulting in higher moisture cheese and increased raw cheese yield. Heal time extended to 30 min resulted in a significantly smaller loss of fat into whey. Healing time had a significant effect on moisture retention, fat loss, and raw cheese yield. AS

2914 Shelef (LA) and Ryan (RJ). Calcium supplementation of cottage cheese. Journal of Dairy Science 71(10); 1988; 2618-2621

Cottage cheese (100 g) provides only 6% of the Ca recommended daily allowance for adults. Samples of fresh cheese were supplemented with Ca salts (chloride, lactate, or phosphate monobasic) to double the Ca content of the cheese to approx. 145 mg/100g, and the effect of the supplementation on taste and microbial stability were studied. Supplementations did not affect pH or microbial stability during 21 d of refrigerated storage. Sensory evaluation results of a 12-member taste panel showed higher flavour and preference scores for control than for all supplemented samples ($P < 0.5$) but no difference in odour, colour, or texture. Overall, chloride appeared to be preferable for Ca content supplementation because only 26% (wt/wt) of the salt was required to obtain the desired Ca content level and the mineral was evenly distributed in the cheese. AS

2915 Vafopoulou (A), Alichanidis (E) and Zerfiridis (G). Accelerated ripening of Feta-cheese, with heat-shocked cultures or microbial proteinases. Journal of Dairy Research 56(2); 1989; 285-296

An attempt was made to investigate whether the acceleration of ripening of Feta cheese using heat-shocked culture or microbial proteinases was possible without impairing the flavour balance. Accelerated ripening was successfully achieved in Feta cheese by the addition of a heat-shocked culture of Streptococcus thermophilus and Lactobacillus delbrueckii sub. Bulgaricus, or neutral or acid microbial proteinase. Optimum levels of microbial proteinases were established at which trichloroacetic acid-soluble N (TCA-N) compounds were increased by about 35% in 40 d. Treated cheese of this age had flavour intensities and body and texture qualities typical of 80 d old control cheeses. Any further increase in TCA-N by adding larger amounts of enzyme resulted in bitterness. Heat shocked culture treated cheese developed similar characteristics to those prepared with neutral or acid proteinases. In contrast to the control cheese, it was necessary in the experimental cheeses to add minute amounts of lamb lipase (0.1-0.2 g/100 kg milk) to the cheese milk to keep the flavour balance. Best organoleptic characteristics were obtained from cheese treated with heat shocked culture, followed by those treated with neutral or acid proteinases. The maturation time for Feta cheese can be halved by using a heat-shocked culture or neutral or acid proteinase. Cheese of accelerated ripening did not over-ripen owing to the enzyme instability at pH lower than 5.2. Also acceleration of proteolysis must by accompained to some extent by acceleration of lipolysis to keep the flavour in balance. MCV

Cheddar cheese

2916 Wehling (RL) and Pierce (MM). Application of near infrared reflectance spectroscopy to determination of fat in Cheddar cheese. Journal of the Association of Official Analytical Chemists 72(1); 1989; 56-58

Near infrared reflectance (NIR) spectroscopy was used to determine that fat content of Cheddar cheese. Through multiple linear regression, calibrations were developed for use with a commercial filter monochromator instrument. A 6-wavelength calibration, using 1734 nm as the primary indicator wavelength, was found to perform satisfactorily. Averaging readings from duplicate sample repacks reduced the standard error of performance (SEP) compared with the use of single readings. For a validation set of 23 samples, the correlation coeff. squared (r^2) between the NIR and Roese-Gottlieb methods was 0.92, with an SEP of 0.44%. Both sample temp. and age of the cheese influenced the NIR response. AS

Yoghurts

2917 Orden (JA), Goyache (J), Blanco (JL), Hernandez (FJ), Domenech (A), Suarez (G) and Gomez-Lucia (E). Growth of Staphylococcus aureus and synthesis of enterotoxins in home-made yoghurt. Zeitschrift fur Lebensmittel-Untersuchung und -Forschung 189(1); 1989; 16-20

Staphylococcus aureus strains FRI-100, S6, FRI-137 and FRI 472 were inoculated into milk to study growth and enterotoxin production in home-made yoghurts. The yoghurt used as starter was progressively weakened by successive inoculations (up to four) in milk to prepare other yoghurts in order to study the ability of yoghurt microflora to inhibit staphylococci. After elaboration, yoghurts were stored at 4 C, 22 C, and 37 C, for a max. of 21 days . Periodically, staphylococcal counts, pH and the production of enterotoxins A, B, C, and D were determined. Enterotoxins were only detected in the last batch. It was concluded that the inhibitory effect of the starter culture is not only due to the decrease of pH, but also to other factors. AS

Milk proteins

Casein

2918 Hill (AR). The Beta-lactoglobulin-x-casein complex. Canadian Institute of Food Science and Technology Journal 22(2); 1989; 120-123

The Beta-lactoglobulin-x-casein complex, which is formed during heat treatment of milk, is stabilized by interactions involving sulphydryl, hydrophobic and ionic groups. The effects of sulphydryl, perturbants on the complex have caused several authors to conclude that disulphide (S-S) bonding is the principal stabilizing factor, but this interpretation involves several assumptions which have not been validated. The effects of ionic Ca and pH strongly suggest that electrostatic factors are more important than S-S bonding, especially at pH greater than 6.5. There is also strong evidence that hydrophobic interactions are improtant, including hydrophobic interactions involving sulphydryl groups of cysteine. Recognition of ionic and hydrophobic effects on complex formation and stabilization is important to thermal processing. AS

2919 Possompes (B), Berger (J), Diaz (B) and Cuq (JL). Factors affecting the evaluation of the nutritional value of severely alkali-treated casein. Food Chemistry 32(3); 1989; 189-199

In this investigation the influence of protein concn. in the diet and age of rats on the nutritional value and consequent adverse effects of a severel alkali treated casein has been studied. It was seen that when alkali treated casein (NaoH, 02, N 80 C, 1 h) was given as sole source of protein at a suboptimal level (10% drymatter) to rats reduced food intake (46%) and retardation of growth were observed. The same parameters were restored to the level similar to control rats receiving 10% protein diet by either increasing protein level from 10% to 20% or by supplementing with CYS, MET, VAL, THR, TYR whereas the food intake was not impaired but growth rate was reduced. The food intake restriction and poor growth rate of rats receiving the alkali treated casein could probably be related to an alteration in content or availability of amino acids and the formation of trypsin inhibitors but not to any toxic factor. NGKR

Whey-proteins

2920 Lambelet (P), Berrocal (R) and Ducret (F). Low resolution NMR spectroscopy: a tool to study protein denaturation. I. Application to dimagnetic whey proteins. Journal of Dairy Research 56(2); 1989; 211-222

A method using low resolution NMR spectroscopy is described for investigating whey protein thermal denaturation. The method is based on measuring at 20 C changes in water proton transverse (T_2) relaxation parameter following the denaturing treatment. This parameter is shown to be sensitive to protein denaturation and not to other phenomena such as gelation. Examples are given for the qualitative study of protein thermal denaturation in whey protein concentrate, Beta-lactoglobulin, Alpha-lactalbumin, bovine serum albumin and immunoglobulins aqueous solutions and for the quantitative detn. of thermal denaturation in whey protein concentrate solutions. AS

MEAT AND POULTRY

Meat

2921 Champion (AE), Purslow (PP) and Duance (VC). Dimension changes of isolated endomysia on heating. Meat Science 24(4); 1989; 261-273

The role of endomysial shrinkage in determining cooking loss was investigated directly by observations on the dimensional changes of isolated endomysial sheaths on heating up to 80 C. Max. shrinkage of 70% in diameter and 40% in length was observed, corresponding to a vol. decrease of over 90%. The temp. at which half the maximal shrinkage occurs is in the range 52-61 C. Minor differences in shrinkage behaviour were observed depending on the methods used to support the endomysia. The dimensional changes of the isolated endomysial sheaths are greater than those reported for whole meat. It is concluded that endomysial shrinkage has the potential to completely account for fluid expulsion from meat on cooking. AS

2922 Knight (P) and Parsons (N). Action of NaCl and polyphosphates in meat processing. Responses of myofibrils to concentrated salt solutions. Meat Science 24(4); 1989; 275-300

When meat is treated with salt, some parts of the meat are exposed to very high salt concn. which then fall during equilibration. To gain a better understanding of the consequence of this treatment, the swelling and extraction of isolated myofibrils treated with series of salt solutions designed to mimic conditions found in salt-treated meat have been observed. Myofibrils swelled most in 1M (5.8%) NaCl and hardly at all in 5 M (29%) NaCl. Similar results were obtained when the concn. of NaCl was raised in steps to 5M. The pronounced extraction of A-band that occurs in 1M NaCl was decreased if higher NaCl concn. were used instead. Lowering the concn. from higher values to 1M caused some swelling and extraction of the A-band, but not as much as when 1M was used directly. Inclusion of pyrophosphate in the solutions had marked effects. There was little swelling in 1M NaCl and none in 5M. Lowering the NaCl concn. to 1M from higher concn. gave more swelling than observed when 1M was used directly. Extraction of the A-band was greatest in 1M, and was strongly inhibited in 5M. Myofibrils treated with 5M NaCl lost the ability to respond to the presence of pyrophosphate in 1M NaCl. The behaviour of myofibrils in high concn. of NaCl alone is similar to that of pieces of meat. However, the persistent swelling of meat when the NaCl concn. is slowly raised to 5 M is not found with myofibrils, suggesting that significant water compartments exist outside the myofibrils in such meat. AS

2923 Nortje (GL), NelL Jordaan (E), Naude (RT), Holzapfel (WH) and Grimbeek (RJ). A microbiological survey of fresh meat in the supermarket trade. Part I. Carcasses and contact surfaces. Meat Science 25(2); 1989; 81-97

2924 Sheridan (JJ) and Lynch (B). The influence of processing and refrigeration on the bacterial numbers of beef and sheep offals. Meat Science 24(2); 1988; 143-150

An investigation was carried out in a commercial abattoir on the influence of processing and refrigeration on a var. of beef and sheep offals. The influence of the different processes and the operations, to the bacterial load before refrigeration of the product, were determined. In general all the operations in the plant had an effect on the final bacterial load. The effect of inadequate refrigeration was noteworthy in all cases and this factor alone made the most significant contribution to the products having a poor shelf-life. AS

2925 Specht (H) and Kunis (J). Effects of combined premortal and postmortal electrical treatment on the quality of meat. Nahrung 32(5); 1988; 439-444

Just as postmortal electrical stimulation of rapidly cooled bovine carcass halves generally has positive effects on the quality of meat (pH, meat consistency, water-binding capacity), the same applies to premortal electrical treatment of animals (electrical stunning) or the combined pre and postmortal electrical treatment. Exemplified for selected muscles of more than 100 heads of cattle of different slaughter class and slaughter category it was demonstrated, however, that combined electrical treatment of bulls is liable to entail a higher percentage of lower-quality DFD-meat. The results of the exp. studies of electrical treatment and quality analysis are presented together witn a discussion of potential sources of quality reduction in the case of bull meat. AS

2926 Wismer-Pedersen (J). Use of haemoglobin in foods. A review. Meat Science 24(1); 1988; 31-45

Blood from domestic meat animals contains biologically valuable protein equivalent to 6-7% of the lean meat content in the carcass. The major part of the protein is haemoglobin in the erythrocytes which even in minute concn. imparts a dark brownish colour to foods. Large scale use of haemoglobin in foods consequently requires that the protein is made colourless unless attempts are made to hide the colour by technological manipulation in processing. The haem pigment can be removed from the globin by extraction with acidified organic solvents, usually acetone, or absorption on certain agents like carboxymethylcellulose. Alternatively, the globin may be digested by proteolytic enzymes and the liberated amino acids separated from the haem by ultrafiltration or centrifugation. Another approach is oxidative destruction of the haem after inactivation of the catalase activity of the erythrocytes. Hydrogen peroxide is preferred as oxidative agent but care must be taken to limit its impairment of protein quality. Because of its high lysine content globin should be suitable for fortification of cereals. Together with the blood plasma globin it may be used to replace meat in cured meat products. Use of blood proteins in foods, may however, sometimes be opposed for psychological reasons. AS

Beef

2927 Andersen (HJ), Bertelsen (G) and Skibsted (LH). Colour stability of minced beef. Ultraviolet barrier in packaging material reduces light induced discolouration of frozen products during display. Meat Science 25(2); 1989; 155-159

2928 Bemthal (PH), Booren (AM) and Gray (JI). Effect of sodium chloride concentration on pH, water holding capacity and extractable protein of prerigor and pastrigor ground beef. Meat Science 25(2); 1989; 143-154

2929 Chen (M-T), Yang (W-D) and Guo (S-L). Differentiation between fresh beef and thawed frozen beef. Meat Science 24(3); 1989; 223-226

2930 Duszkiewicz-Reinhard (W), Khan (K) and Funke (B). Microbiological evaluation of navy bean flour and its blend with retail ground beef. Meat Science 24(3); 1989; 189-199

Sterile water suspensions of navy bean flour (NF) were used as a model medium on which the growth of eight microorganisms important for food hygiene and technology was evaluated. Almost all microorganisms grew better on model mediums with 10 and 15% of NF than on the nutrient broth (control). Retail ground beef with and without 5, 10 and 15% addition of NF was wrapped with plastic film and stored at 4 C. Aerobic plate count, psychrophiles, coliforms and yeasts and molds were assessed after 0, 3 and 6 days. Navy bean flour added to ground beef had a significant effect only on aerobic plate count. Growth of psychrophiles, coliforms, yeasts and molds was not affected by addition of NF. Microflora of retail ground beef-NF blends mainly consisted of Lactobacillus spp., while other genera of bacteria were found in smaller numbers. The pH of blends increased in proportion to the level of NF added and was significantly higher in comparison with retail ground beef alone, but decreased during storage due to the large amount of lactic acid bacteria. AS

2931 Jones (SDM) and Robertson (WM). The effects of spray-chilling carcasses on the shrinkage and quality of beef. Meat Science 24(3); 1989; 177-188

2932 Kunis (J) and Specht (H). Process criteria of cold shortening in beef and methods to prevent it. Nahrung 32(5); 1988; 433-438 (De).

Practical studies were made on both hot-removed and cold-removed individual muscles and bovine quarters and halves of a total of 113 animals to determine the conditions causing cold shortening in beef. The results showed that cold shortening cannot be prevented under the prevailing conditions of rapid cooling and deep freezing within 35 h of slaughtering. Different approaches to rapid cooling of carcass parts were computer simulated by the finite-difference method in order to investigate whether or not the phenomenon of cold shortening can be prevented by suitable cooling parameters. This is exemplified by the temp. patterns in a bovine hind leg as compared for two -dimensional heat flow and shown in a graph. The results obtained by simulation suggest that the phenomenon of cold shortening in rapid cooling and deep freezing can only be prevented by previous electrical stimulation. AS

2933 Nortje (GL), Nel (L), Jordaan (E), Naude (RT), Holzapfel (WH) and Grimbeek (RJ). A microbiological survey of fresh meat in the supermarket trade. Part 2. Beef retail cuts. Meat Science 25(2); 1989; 99-112

2934 Quali (A), Zabari (M), Renou (JP), Touraille (C), Kopp (J), Bonnet (M) and Valin (C). Anabolic agents in beef production. Effect on muscle traits and meat quality. Meat Science 24(3); 1989; 151-161

2935 Torres (E), Pearson (AM), Gray (JI), Ku (PK) and Shimokomaki (M). Lipid oxidation in charqui (salted and dried beef). Food Chemistry 32(4); 1989; 257-268

Mutton

Lamb

2936 Ouali (A), Zabari (M), Lacourt (A), Talmant (A), Monin (G), Kopp (J) and Valin (C). Usefulness of various biochemical and histochemical characteristics as indices of muscle type in lamb carcasses. Meat Science 24(4); 1989; 235-247

Contractile and metabolic characteristics of five different muscles from an homogeneous group of seven lambs were studied. Muscle typing was assessed by measuring myofibrillar ATPase and lactate dehydrogenase activities, myosin (FM1, FM2, FM3, SM1, SM2) and LDH (M_4 , M_3 H, M_2 /H_2 , MH_3 , H_4) isoforms levels as well as fibre types comp. (SO, SOG, FOG, FG). On this basis, muscles were classified as slow-twitch oxidative (diaphragm and supraspinatus), intermediate (triceps brachii), fast-twitch oxidative-glycolytic (longissimus dorsi) and fats-twitch glycolytic (tensor fascia latae). Discriminant factor analysis of data revealed that variables enabling a better discrimination of muscles (FG, SM1, FM2, FM1, H_4) exhibited the lowest efficiency to discrimate animals. Furthermore, in contrast to LDH isoforms and fibre type comp. subsets of variables, myosin isoforms analysis allowed a quaite total identification of muscle classes since, 97.5% of the muscles were well ranged in their respective classes. Although animals were zootechnically similar, animal variability was important and animal effect was essentially detected through changes in the following set of variables M_3 H, MH_3 So and ATPase. AS

Pork

2937 Gordon Greer (G) and Murray (AC). Effects of pork muscle quality on bacterial growth and retail case life. Meat Science 24(1); 1988; 61-71

2938 Honkavaara (M). Influence of PSE pork on the quality and economics of cooked, cured ham and fermented dry sausage manufacture. Meat Science 24(3); 1989; 201-207

2939 Vander Wal (PG), Bolink (AH) and Merkus (GSM). Differences in quality characteristics of normal, PSE and DFD pork. Meat Science 24(1); 1988; 79-84

Products

Meat

Sausages

2940 Houben (JH) and Krol (B). Effect of citric acid, citrate and slight water activity decreased on the bacteriological stability of Hague liver sausage. Meat Science 24(3); 1989; 163-176

Combinations of cirtic acid and citrate, with several carbohydrates and KCl, were tested in a canned Hague liver sausage model for their antimicrobial properties. pH values for the test products ranged from 5.38 to 6.48 water activity values varied from 0.960 to 0.977. Before pasteurization, the sausage doughs were contaminated with mixtures of bacterial spores. Since the bacteriological stability, sometimes appeared to be considerably improved, heated packages were challenged by incubation at 20 C and 30 C, some of them for up to 2 yrs. Incubated packages from the standard formation spoiled at 30 C within 3 days. Starting from this point, products with a variable, but increased, bacteriological stability were obtained. For the best stabilized batches, first symptoms of spoilage were observed after periods of incubation at 30 C, ranging from 49 to 150 days. Combinations of pH and water activity values which can be relied upon to yield stable products consistently, cannot be derived from the accumulated data. Citric acid appeared a far more effective stabilizer than its salt. If the undissociated citric acid concn. for these products (water activity 0.960-0.972) is regaraded as a significant parameter, values above approx. $13\ \mu\ m\ kg^{-1}$, yield products with remarkable bacteriological stability. AS

Poultry

2941 Humbert (F), Salvat (G), Colin (P), Lahellec (C) and Bennejean (G). Rapid identification of Salmonella from poultry meat products by using "Mucap test". International Journal of Food Microbiology 8(1); 1989; 79-83

A study was made in order to improve a new Salmonella identification test (Mucap Test) in which umbelliferone is released, giving a blue fluorescent light under a wood lamp, after contact with Salmonella colonies. The study concerned 354 colonies, previously isolated from 55 poultry meat samples. Two enrichment median (Tetrathionate Bile Broth (TBB) and Rapparport Vassiliadis (RV)] and two isolation media (Brilliant Green Agar (BGA) and Desoxycholate Agar (DA)] were used, and the results of the test obtained resp. with each association were compared. The sensitivity was consistently good, but the specificity of the test was generally poor. The best association seemed to be RV/DA which gave 85% specificity, against 39% for TBB/BGA, 58% for TBB/DA, and 77% for RV/BGA. The predominent genera responsible for false-positive results were Pseudomonas and Proteus providencia. AS

Chickens

2942 Gregory (NG) and Wilkins (LJ). Effect of slaughter method on bleeding efficiency in chickens. Journal of the Science of Food and Agriculture 47(1); 1989; 13-20

The effect of inducing a cardiac arrest, at stunning, on the wt. of blood collected at slaughter was examined in broiler, chickens when using seven different neck cutting methods. Cardiac arrest resulted in a slower initial rate of bleeding for each neck cutting method, but by 2.25 min after neck cutting there was no effect on the amount of the blood collected. The cardiac arrest treatment were associated with a higher incidence of haemorrhaging in the wings. AS

2943 Schafheitle (JM) and Light (ND). Sous-vide preparation and chilled storage chicken ballotine. International Journal of Food Science and Technology 24(2); 1989; 199-205

Broilers

2944 Smith (DP) and Fletcher (DL). Compositional and biochemical variations within broiler breast muscle subjected to different processing methods. Poultry Science 67(2); 1988; 1702-1707

Three exp. were conducted to evaluate the chemical and biochemical comp. of broiler breast meat as a function of intramuscular locations and different processing treatments. Birds were obtained from a commercial processing plant and killed via cervical dislocation. The breast meat was 1) removed immediately post-mortem (hot-bonded, HB), 2) immediately removed and chilled 24 h (hot boned and aged, HB-A) or 3) conventionally processed (chilled 24 h prior to breast meat removal, CP). Meat samples were removed from the anterior, middle, and posterior areas of the Pectoralis major, and from the anterior and posterior area of the P. minor. In Exp. 1 samples were analyzed for percentage moisture, protein, lipid, and ash and residual glycogen content after storage. In Exp. 2. and 3, lactate and glycogen contents were determined immediately for the CP and HB treatments only. No significant differences in moisture, protein, lipid, ash or residual glycogen were found by location with in either of the breast muscle in Exp. 1. The HB and HB-A muscles had significantly higher moisture contents (73.0 and 73.5%) than CP muscle (72.1%) but no difference in protein, lipid and ash was detected on a dry wt. basis. In Exp. 2 and 3 glycogen content tended to be greater in the posterior location of the P. minor only and lactate greater in the posterior location of the CP treatment of Exp. 3 only. No differences were noted for either glycogen or lactate by location with in the P. minor. AS

Turkeys

2945 Ahn (DU) and Maurer (AJ). Effects of added nitrite, sodium chloride, and phosphate on colour nitrosoheme pigment, total pigment, and residual nitrite in oven-roasted turkey breast. Poultry Science 68(1); 1989; 100-106

Sixteen combinations of nitrite, [0, 1, 10, 50, p.p.m.], NaCl (0, 2%), and phosphate (0, .5%) were mixed with turkey breast meat before cooking to determine the main effects and interactions on colour (redness, a; yellowness, b; lightness, L) value, nitrosoheme pigment, total pigment, and residual nitrite on oven-roasted turkey breast meat. Addition of 1 p.p.m. nitrite caused a significant colour change in oven-roasted turkey breast meat. By increasing nitrite level, a values, nitrosoheme pigment, total pigment, and residual nitrite significantly ($P < .01$) increased, but b and L values significantly decreased. No differences were found between parameters at the 10 p.p.m. and 50 p.p.m. levels of added nitrite except for that of residual nitrite. Sodium chloride increased a values ($P < .05$) and residual nitrite but significantly decreased b and L values. Sodium chloride also decreased nitrosoheme pigment and total pigment in nitrite-treated meat. Phosphate decreased L values but increased ($P < .01$) residual nitrite in the samples treated with 10 p.p.m. and 50 p.p.m. nitrite. A salt x phosphate interaction decreased L values at all nitrite levels except that of 10 p.p.m. added nitrite, but significantly ($P < .01$) increased a values and decreased b values in the samples with 50 p.p.m. added nitrite. Total pigment was significantly ($P < .05$) increased by a salt x phosphate interaction in the 0 and 1- p.p.m. nitrite samples, but residual nitrite was increased only in the 10 and 50- p.p.m. nitrite samples. AS

Poultry products

Eggs

2946 Oguntona (T). Amino acid composition of guinea fowl's egg. Journal of the Science of Food and Agriculture 48(1); 1989; 111-113

Samples of eggs from two breeds (white-breasted and Pearl) of guinea hens which were housed either on deep litter or in layer cages were analysed for their content of amino acids. This protein content of whole egg ranged from 482 to 494 mg g^{-1}, with a mean of 487 mg g^{-1}. Concn. of the various amino acids in the egg ranged from 118 mg (tryptophan) to 752 mg (glutamic acid) per g N. The mean concn. of total sulphur amino acids was 395 mg per g N. Overall the amino acid comp. of guinea fowl egg was not affected by either breed or housing system. AS

SEAFOODS

Shrimps

2947 Chakrabarti (R). The use of selective dense media in separation of meat and preparation of an intermediate moisture product from small shrimps. International Journal of Food Science and Technology 24(2);

1989; 211-215

Fish

2948 Munkner (W) and Gudlik (G). About the rational utilization of fish as raw material. Lebensmittelindustrie 35(5); 1988; 226-227

This article describes the manufacturing technology and product quality of fried stick from frozen minced flesh of water fish (Leuciscus rutilis L. bream Abramis brama L. and perch Perca fluvialtilis). BV

2949 Wagner (H) and Buddruss (R). Model of the optimization of the equipment of fishing vessels with processing technique. Lebensmittelindustrie 35(5); 1988; 223-225 (De).

2950 Witas (T) and Sledziewski (P). The optimum condition for malonic dialdehyde liberation from smoked fish and curing smoke condensates. Nahrung 32(5); 1988; 497-502

The aim of this study was to establish the conditions for malonic dialdehyde liberation from smoked fish and curing smoke condensates, as well as to determine its content in smoked fish. The specific absorption peaks of coloured solutions of malonic dialdehyde, from curing smoke condensates, with 2-thiobarbituric acid were determined. The conditions for malonic dialdehyde liberation were established, i.e. , time and degree of alkaline hydrolysis of condensate, degree of distillation of acidified condensate solution, the conditions of coloured solution development, detn. of extinction and method of calculation of malonic dialdehyde content in smoked fish, in individual layers of smoked mackerel fillets. The mechanism of formation of polycyclic aromatic hydrocarbon and hydrogen peroxide or hydroxyl free radicals, formed during pyrolysis or organic compounds in the presence of liberated malonic dialdehyde, was proposed. AS

Pate

2951 Zurera-Cosano (G), Moreno-ROjas (R), Pozo-Lora (R) and Rincon-Leon (F). Mineral elements in canned Spanish liver pate. Food Chemistry 32(3); 1989; 217-222

In this paper the changes that occur in the concn. of Cu, Fe, Zn, Pb and Ca in canned liver pate have been studied and results presented. The detn. were performed with a Perkin-Elmer model 2380 Atomic Absorption Spectrophotometer. Data obtained from the chemical analyses of the samples were evaluated statistically using model I and repeated measure analysis of variance. Each sample was divided into five portions based on their contact with a specific part of the container. It was found that statistically significant differences were found to exist among the brands for all the minerals and among the portions only in the case of Pb. The differences in the concn. of lead between the portion nearest to the solder on the side flap and the rest of the portions were statistically significant. However the differences observed for Ca, Cu, Fe, and Zn are not significant. When compared to literature data the influence of the solder as a lead contaminator was shown. NGKR

Tripe

952 Goktan (D), Tuncel (G) and Unluturk (A). The effect of vacuum packaging and gaseous atmosphere on microbial growth in tripe. Meat Science 24(4); 1989; 301-307

Changes in bacterial flora of tripe samples, stored at 4 C in air, vacuum packaged or in carbon dioxide enriched atm. were studied. Aerobic plate counts showed a rapid increase in samples stored in air reaching a level of 1.6 x 10^8 g from an initial level of 9.0 x 10^3 g. The aerobic bacterial population was inhibited in both vacuum packed and carbon dioxide enriched atm, storage. The shelf lives of samples stored in air, under vacuum packaging or in gas mixtures, were 4, 8 and 9 days, resp. Enterobacteriaceae and anaerobic counts tended to be higher under vacuum storage than in a carbon dioxide enriched atm. The numbers of lactic acid-producing bacteria were generally found to be lower under vacuum storage than in gas mixtures. AS

Products

Fish

953 Hoppner (K) and Lampi (B). Total folate, pantothenic acid and biotin in some fish products. Canadian Institute of Food Science and Technology Journal 22(2); 1989; 170-172

Total folate, pantothenic acid and biotin levels were determined in different raw and processed fish products by microbiological assay. The data for these vitamins in the raw and processed fish products provide additional information for improving the database of the Canadian Nutrient file. AS

Fish oils

954 Karahadian (C) and Lindsay (RC). Evaluation of compounds contributing characterizing fish flavour in fish oils. Journal of the American Oil Chemists" Society 66(7); 1989; 953-960

Vacuum steam-deodourized fish oils oxidized under flourescent light (950 lux) at 21 C initially developed green flavours which were caused principally by t, c-2,6-non-adienal, but some green-type flavour notes were contributed by t-2-hexenal and 1,c-5-octadien-3-one. Diminishment of green flavour notes resulted from the depletion of 2,6-nonadienal and the formation of c-4-heptenal () 1 p.p.m.) which contributed oxidized, burnt flavour notes. Concomitant formation of t,c,c-and t,t,c-2,4,7-decatrienal () 1 p.p.m.) yielded characterizing burnt/fishy or cod liver oil-like flavours in fish oils. Two unidentified compound exhibiting minnow-bait-bucket and trout-like odour qualities, resp., were encountered in oxidizing fish oils. Hexanal, 2,4-heptadienals and 2,4-decadienals contributed general oxidized, painty flavours to fish oils. AS

Fish paste

2955 El-Sanafery (N (Y), Sorour (AE) and Ibrahim (HM). Biological values of sausage and fish paste style (fish burger). Crasas Y Aceites 39(1); 1988; 8-12

The present work was planned to use fish protein mass (FPM) prepared from whole small bolti fish as meat substitute during production of fish paste, meat and fish sausage. On the contrary, fish protein concentrate (FPC) prepared either from meat or viscera of bolti was used for preparing bosara like-product. The three products (fish paste, sausage and bosara powder) were analysed for their amino acid patterns and the essential amino acids index (EAAI), biological value (BV), as well as protein efficiency raito (PER) were calulated. The available data proved the high nutritional values and suitability of these items for consumption. AS

PROTEIN FOOS

Nil

ALCOHOLIC AND NON-ALCOHOLIC BEVERAGES

2956 Smith (VJ), Green (RA) and Hopkins (TR). Determination of aspartame in beverages using an alcohol oxidase enzyme electrode. Journal of the Association of Official Analytical Chemists 72(1); 1989; 30-33

A new method for the detn. of the artifical sweetener aspartame is described. Alpha-Chymotrypsin is used to cleave the methyl ester group of aspartame, producing methanol hydrolytically. The methanol is detected using an electrode which is constructed by physically trapping yeast alcohol oxidase enzyme at the tip of a dissolved oxygen electrode. The decrease in oxygen concn. which occurs as methanol is enzymatically oxidized to formaldehyde, is measured amperometrically. Aspartame levels in diet soft drinks as determined by the proposed method and by liquid chromatography are in excellent agreement. The relative standard deviation of the measurements is 0.83%. The methanol present in diet cola as a result of aspartame degradation can also be measured by using the electrode without alpha-chymotrypsin. AS

Alcoholic beverages

2957 Scriven (FM), Grains (N), Green (SR) and Thomson (DMH). A contextual evaluation of alcoholic beverages using the repertory grid method.

International Journal of Food Science and Technology 24(2); 1989; 173-182

Twenty subjects were used to investigate the contexts in which they typically consumed a range of alcoholic beverages. Contexts were elicited using the repertory grid method, and five principal components were found to describe the perceptual dimensions common to most people. The poles of these dimensions are summarily interpreted as; thirst quenching vs. not; formal meal vs. social drinking environment; before meals vs. after meals; in a pub vs. outside a pub; consumed meat vs. mixed. The ways in which this information can used to develop marketing strategies and influence product development is discussed. AS

Beer

2958 Dale (CJ), Young (TW) and Brewer (S). Amino acid analysis of beer polypeptides. Journal of the Institute of Brewing 95(2); 1989; 89-97

Beer samples collected from a series of pilot breweries, brewed under standard conditions using various adjuncts were analysed for their amino acid profiles of peptides. Beers prepared from grits containing torrified wheat, wheat flour and malted wheat contained greater proportion of glutamic acid/glutamine, compared to material prepared from all barley malt beers. The comp. of the grits influenced the amino acid comp. of the beer polypeptides, and the principle amino acid, comprised glutamic acid/glutamine, proline, glucine and aspartic acid/aspargine. The dialysed fractions with MW > 60000 contained polypeptide material derived from wheat proteins. The beers from all malt, 80% malt & 20% torrified wheat, 50% malt and 50% malted wheat contained cereal globulins and albumins, where as the beers prepared from 100% wheat malt contained polypeptides derived from cereal prolamins and globulins. NGM

2959 Munck (L), Jorgensen (KG), Ruud-Hansen (J) and Hansen (KT). The EBC methods for determination of high molecular weight Beta-glucan in barley, malt, wort and beer. Journal of the Institute of Brewing 95(2); 1989; 79-82

The two standard methods of beta-glucan measurement in barley, malt, wort and beer were tested by the EBC collaborative test analysis committee; the fluorometric method based on specific interaction of fluorochrome calcofluor with beta-glucan and the enzymic method based on degradation of beta-glucan by purified enzyme were tested with 14 participating lab. The collaborative test resulted in acceptable statistical values for repeatability and reproductibility for both the methods. Both the methods are highly correlated and the values of beta-glucan obtained are comparable with actual values of beta-glucan determined by other methods. NGM

Hops

2960 Irwin (AJ). Varietal dependence of hop flavour volatiles in lager. Journal of the Institute of Brewing 95(3); 1989; 185-194

The article deals with the chromatographic-mass spectroscopic analysis of hop based compounds formed during brewing. A series of lager brewed with single hop var. were analysed. Each hop var. contributed a small number of unique flavour compounds to beers. The important classes of compounds such as esters, monoterpenes and sesquiterpenes differed in their concn. with different var. of hops. NGM

Worts

2961 Buckee (GK) and Baker (CD). Estimation of fermentable carbohydrates. Journal of the Institute of Brewing 95(2); 1989; 111-114

The high performance liquid chromatographic procedure was used to estimate fermentable sugars in wort. A resolve catridge containing silica modified with tetraethylenepentamine was used with acetonitrile/water as eluting solvents. The carbohydrate concn. as gram per 100 ml of wort were calculated from peak areas measurement. The validity of the method was tested by five participating lab. analysing 5 samples pairs and it was found that the repeatability (r^{95}) and reproducibility (R^{95}) very good. NGM

Whisky

2962 Riffkin (HL), Wilson (R), Howie (D) and Muller (SB). Ethyl carbamate formation in the porduction of pot still whisky. Journal of the Institute of Brewing 95(2); 1989; 115-119

Very small levels of ethyl carbamate, a carcinogenic compound is formed when the wort is boiled in copper. Traces of copper dissolved in the wort forms a precursor compound for formation of ethyl carbamate during distillation. Removal of dissolved copper by chelation or by other means prevents formation of ethyl carbamate. Its formation is favoured between pH 4 and 6. NGM

Wines

2963 Perez-Olmos (R) and Echevarria (J). Comparative study of ion-selective electrodes versus flame emission photometry technique for the determination of sodium and potassium in Spanish wines. Food Chemistry 32(3); 1989; 201-207

In this investigation two different analytical methods were adopted to determine the concn. of both ions viz Na and K in sixty three samples of red, rose and white wines taken from several wine growing areas of Spain. The technique as based on multiple known addition with the equipment autochemistry system orion 960 and the other method reference technique by flame omission photometry. The results showed a great accordance in terms of standard deviation and percentage of spike recovery. NGKR

2964 Sales (D), Valcarcel (MJ), Romero (LI) and Martinez de la Ossa E). Anaerobic digestion kinetics of wine-distilleries wastewaters. Journal of Chemical Technology and Biotechnology 45(2); 1989; 147-162

Experimental results of anaerobic digestion of wine-distilleries wastewaters are compared with those obtained from two theoretical kinetic models; the substrate utilization model and the methane fermentation model. Both models predict accurately the performance of this depurative process, except at retention times less than 3 days, because the systems works under non-steady state conditions. For depuration levels greater than 95% optimum retention time is 6 days, and methane vol. (at STP) produced per gram of substrate added to the digester are 0.24 dm^3 g^{-1} chemical oxygen demand. AS

2965 Thornton (RJ) and Bunker (A). Characterisation of wine yeasts for genetically modifiable properties. Journal of the Institute of Brewing 95(3); 1989; 181-184

Forty eight wine yeast strains (Saccharomyces cerevisiae) procured from Australian wine research institute, New Zealand Ruakura collection centre and from commercial sources were screened for genetically modifiable properties of wine making significance. Forty one yeast strains were resistant to 200 p.p.m. Copper sulphate eight strains, did not produce hydrogen sulphide and twenty six strains did not produce phenolic off-flavours, 32 strains showed flocculation properties. Four yeast strains possessed K2 + zymoeral activity, three were neutral and fifteen were zymacide sensitive. Two strains AWRI79 and R150 were presumed to possess desirable characters of non-hydrogen sulphide, no off-flavour production, resistant to copper and had some degree of flocculation. NGM

Non-alcoholic beverages

2966 Miedzobrodzka (A) and Wladymirak (H). An attempt to fortify drinking juices with magnesium salts. Nahrung 32(5); 1988; 511-512

Fruit juices

Apples juices

2967 Malcolmson (LJ), Jeffery (L), Sharma (DD) and Ng (PKW). Relationship between sensory clarity and turbidity values of apple juice. Canadian Institute of Food Science and Technology Journal 22(2); 1989; 129-132

The relationship between sensory estimates of clarity and instrumental turbidity values was determined using a series of apple juice turbidity solutions prepared from a stock solution of kaolin and apple juice. Sensory clarity was assessed by eight experienced panelists using the method of magnitude estimation, and instrumental turbidity readings were obtained using a nephelometer. A linear relationship was found where log perceived clarity = -0.54 (log instrumental turbidity) + 1.83. The calculated slope indicates that a large changes in turbidity was necessary before the panelists could observe a change in clarity. This equation was used to predict sensory clarity from instrumental turbidity values for commercial apple juice samples. AS

FATS AND OILS

Fats

2968 Oboh (FO) and Oderinde (RA). Fatty acid and glyceride composition of Astrocaryum vulgare kernel fat. Journal of the Science of Food and Agriculture 48(1); 1989; 29-36

The kernel comp., lipid classes, fatty acid comp., fatty acid distribution of triglycerides and triglyceride comp. of kernel fat from Astrocaryum vulgare Mart palms grown in Nigeria have been studied. Kernels had a high fat content. Lauric acid was the predominant fatty acid in the whole fat and was also the major fatty acid in the triglycerides and in the 2-monoglycerides derived from them by pancreatic lipase hydrolysis. All the fatty acids exhibited a preference for the 1- and -3, positions of triglycerides, except for lauric which showed a preference for the 2-positions and oleic which exhibited a random distribution. The trisaturated triglycerides were the predominant triglyceride type and the fatty acid comp. of the various triglycerides suggested on absence of completely unsaturated triglycerides. AS

2969 Perez-Camino (MC), Guinda (A), Marquez-Ruiz (G) and Dobarganes (MC). Alteration of used frying fats. II. Variables affecting the continuous frying process and practical application in industrial fryers. Crasas Y Aceites 39(1); 1988; 39-43 (De).

Butter

2970 Farag (RS), Ali (MN) and Taha (SH). Use of some essential oils as natural preservatives for butter. Crasas Y Aceites 39(1); 1988; 28-31

Thyme and cumin spice essential oils were used in the present study as an attempt to prevent butter deterioration during storage at room temp. Butter oxidation and lipolysis were followed by measuring the acid, peroxide and TBA values. Lipolytic acidity and total microbial and lipolytic bacterial counts were also measured. During buffer storage, very little changes in the peroxide and TBA values were found while a gradual increase in the acid value was noticed. The data for lipolytic activity, total microbial and lipolytic bacterial counts were concomitant with the acid values. Thyme and cumin spice essential oils showed a greater anti-hydrolytic effect and act as superior preservative compared to BHT. AS

Sal fats

2971 Yella Reddy (S) and Prabhakar (JV). Effect of triglycerides containing 9, 10-dihydroxystearic acid on polymorphism of sal (Shorea robusta) fat. Journal of the American Oil Chemists" Society 66(6); 1989; 805-808

The effect of the triglycerides containing 9, 10-dihydroxystearic acid (DHS-TG) on the phase transition of polymorphic forms of normal triglycerides (TG) of sal fat was investigated by differential scanning calorimetry (DSC) under different cooling and heating modes. Four levels of DHS-TG, 2, 5, 8 and 10%, were used. DHS-TG accelerated the phase transition of lower melting crystal forms I - II - III of TG obtained under rapid (20 C/min) or slow (2 C/min) rates of cooling. They delayed the phase transition of crystal from III to IV of TG at 0 C. Also, DHS-TG reduced the heat of fusion (DeltaH) of the stable form (V) of TG obtained after temp. at 0 C and at 26 C. AS

Oils

2972 deKanterewicz (RJ), Pilosof (AMR) and Bartholomai (GB). Simple method for determining the spontaneous oil absorption capacity of proteins and the kinetics of oil uptake. Journal of the American Oil Chemists" Society 66(6); 1989; 809-812

A simple method was developed for determining the spontaneous oil uptake and the kinetics of oil uptake by several food protein materials. The amount of oil taken up by a protein powder during time t was described by the equation $q = Qt/(B + t)$, where Q is the total oil uptake at equilibrium and B is the time rerquired to sorb Q/2. The rate of oil uptake was proportional to the square of the amount of oil that must still be absorbed to reach equilibrium. A specific rate constant for the process was calculated as $(BQ)^{-1}$ and an initial rate of oil uptake as Q/B. AS

2973 Raghavan (SK), Reeder (SK) and Khayat (A). Rapid analysis of vegetable oils flavour quality by dynamic headspace capillary gas chromatography. Journal of the American Oil Chemists" Society 66(7); 1989; 942-947

From the gas chromatographic profiles of volatiles, three compounds viz, t-2-heptenal, t-2-octenal and t,t,2,4-decadienal were selected for computation of the flavour score of individual oil samples. Analysis of flavour quality of soybean oil and corn oil by this technique demonstrated good correlation to the sensory evaluation procedure. MNK

2974 Rasper (VF) and Kamel (BS). Emulsifier/oil system for reduced calorie cakes. Journal of the American Oil Chemists" Society 66(4); 1989; 537-542

Emulsifiers and vegetable oils (corn oil and canola oil) were tested for their effects on the functionality of white layer cake batters. MNK

2975 Shah (KJ) and Venkatesan (TK). Aqueous isopropyl alcohol for extraction of free fatty acids from oils. Journal of the American Oil Chemists" Society 66(6); 1989; 783-787

Liquid-liquid extraction of fatty acids from a vegetable oil is accomplished by aqueous isopropyl alcohol in the ratio of 1:1 in two-stage extractions at 30 plus or minus 2 C. The mixtures studied contained 0 to 50% fatty acids in groundnut oil, and aqueous isopropyl alcohol solutions were of 75, 80, 85, 91, 95 and 99% concn. Phase separation depends on (i) the fatty acids content in the model mixture and (ii) the concn. of aqueous isopropyl alcohol. Selective fatty acid separation and phase separation could be achieved by use of aqueous (75 and 80%) isopropyl alcohol over the whole range of fatty acid content in the model mixture. AS

2976 Sun (H-J). A rapid method for the determination of trace Cu and Fe in edible salad oil by graphite furnace atomic absorption spectroscopy. Journal of the American Oil Chemists" Society 66(4); 1989; 549-552

In the detn. of trace amounts of Çu and Fe in edible salad oils by graphite furnace atomic absorption spectroscopy (GFAAS), an ashing method with low temp. oxygen plasma was used to effectively eliminate the interference of the organic matrix. Two sample preparation methods were studied, extraction with concentrated nitric acid followed by ashing with the low temp. oxygen plasma to determine the yield of extraction, and direct analysis of the metal content after dilution with methyl isobutyl ketone (MIBK). Results obtained from these methods were compared with the background absorbance by inductively coupled plasma-atomic emission spectroscopy (ICP-AES). AS

2977 Warner (K), Frankel (EN) and Mounts (TL). Flavour and oxidative stability of soybean, sunflower and low erucic acid rapeseed oils. Journal of the American Oil Chemists" Society 66(4); 1989; 558-564

Three samples each of soybean, sunflower and low erucic acid rapeseed (LEAR) oils were evaluated for flavour and oxidative stability. The commercially refined and bleached oils were deodourized under identical conditions. No significant differences were noted in initial flavour quality. After storage at 25 C or 60 C in the dark, soybean oils-with or without citric acid- were more stable than either sunflower or LEAR oils. However, in the presence of citric acid, soybean oils were significantly less stable to light soybean oils were significantly less stabel to light exposure than either LEAR or sunflower oils. In contrast, in the absence of citric acid, soybean oils were significantly more light stable than LEAR oils. In either the presence or absence of citric acid, sunflower oil was significantly more stable to light than soybean oil. Analyses by static headspace GC showed no significant differences in formation of total volatile compounds between soybean and LEAR oils. However, both oils developed significantly less total volatiles than the sunflower oil. Each oil type varied in flavour and oxidative stability depending on the oxidation method (light vs dark storage, absence vs presence of citric acid, 100 C vs 60 C). AS

Cottonseed oils

2978 Farag (RS), Badei (AZMA) and El Baroty (GSA). Influence of thyme and clove essential oils on cottonseed oil oxidation. Journal of the

American Oil Chemists" Society 66(6); 1989; 800-804

Simple model systems composed of refined cotton seed oil and thyme oil or clove oil, without additives, were designed to approx. conditions in natural oils in order to study their oxidation behaviour. Three methods were used to follow cottonseed oil oxidation, i.e., coupled oxidation with Beta-carotene, the TBA test and hydroperoxide number. The results illustrate that clove and thyme oils at various concn. exhibit antioxidant activity and this phenomenon for clove oils is superior to that of thyme oil. Sensory evaluation tests indicate that the addition of thyme oil or clove oil to cottonseed oil at concn. ranging from 50 to 1200 p.p.m. do not affect the odour note of cottonseed oil. Therefore, thyme and clove essential oils are recommended for use as natural antioxidants to suppress lipid oxidation. AS

Groundnut oils

2979 Sanders (TH) and Larry Greene (R). The relationship of peanut maturity to 2-methylpropanal in headspace volatiles. Journal of the American Oil Chemists" Society 66(4); 1989; 576-580

Headspace volatiles from peanuts of five consecutive maturity classes from three soil temp. were determined to evaluate the relationship of peanut maturity and 2-methylpropanal. Cured, ground peanuts were held in closed vials for 30 min at 150 C before headspace sampling. Quantitation as percent of total volatiles and p.p.m. in the peanuts revealed a decrease in 2-methylpropanal as peanuts matured regardless of seed size within maturity class. From peanut lots in which maturity-size relationships had been determined, headspace analysis of commercial sized lots indicated that the concn. of 2-methylpropanal was related to the maturity distribution (per cent of each maturity class) within each sized lot. These data/techniques may have application in estimating lot-to-lot maturity-related peanut flavour/quality potential. AS

Plectranthus mollis oils

2980 Daultatabad (CMJD) and Mirajkar (AM). Vernolic and cyclopropenoid fatty acids in Plectranthus mollis, syn. Plectranthus incanus, Link seed oils. A rich source of oil. Journal of Chemical Technology and Biotechnology 45(2); 1989; 143-146

Plectranthus mollis, syn Plectranthus incanus is a rich source of vegetable oil and shows sufficient promise for its exploitation as an alternative source of commercial oil. Plectranthus incanus link seed oil contains the following acids: palmitic (7.2%), stearic (13.6%), olein (21.1%), linoleic (46.5%), malvalic (2.3%), sterculic (3.2%) and vernolic (6.1%). BV

Rice bran oil=

2981 Nasirullah , Krishnamurthy (MN) and Nagaraja (KV). Effect of stabilisation on quality characteristics of rice bran oil. Journal of the

American Oil Chemists" Society 66(5); 1989; 661-663

The quality characteristics of rice bran oil obtained from acid, heat and cold stabilised rice bran were studied. The results obtained indicate that these different stabilisation methods of rice bran had no effect on the physical and chemical characteristics and fatty acid comp. of rice bran oil. MNK

Soybean oils

2982 Heldal (JA), Moulton (SrKJ) and Frankel (EN). Fixed-bed continuous hydrogenation of soybean oil with palladium-polymer supported catalysts. Journal of the American Oil Chemists" Society 66(7); 1989; 979-982

To compare a continuous hydrogenation system with batch hydrogenation, soybean oil was treated with Pd and Ni catalysts in a fixed-bed system under conditions that gave trickle flow. The influence of processing variables such as space velocity, pressure, temp. and hydrogen flow on the selectivity, specific isomerization and the activity was investigated. Both the Pd and Ni catalysts gave significantly lower specific isomerization (trans isomer per drop in Iodine Value) when compared to reported values for batch hydrogenation with similar type catalysts. The linolenate and linoleate selectivities were also significantly lower. Heterogenized homogeneous Pd-on-polystyrene catalyst gave lower specific isomerization formation and higher selectivity that carbon-supported Pd catalysts at same conditions. This work indicates that Pd-on-styrene, Pd-on-carbon and extruded Ni catalysts, in fixed-bed continuous hydrogenation can produce soybean oil of desirable comp. after further optimization. AS

2983 Lai (M-T), Lin (W-M), Chu (Y-H), Chen (S-LY), Kong (K-S) and Chen (C-W). The mechanism of colour reversion in soybean salad oil. Journal of the American Oil Chemists" Society 66(4); 1989; 565-571

An enzymatic reaction might be the major cause of colour reversion in soybean oil. During the soybean flaking process, enzymatic reactions take place to convert Gamma-tocopherol to 5-(tocopheryloxy)-Gamma-tocopherol (gamma-TED), and then further convert Gamma-TED to the precursors which are the cause of colour reversion. The variations of Gamma-tocopherol and Gamma-TED contents in soybean oil are accompained by an inverse change in the precursors' concn. Therefore, the contents of Gamma-tocopherol or Gamma-TED in crude soybean oil could be used as an index for predicting the colour quality (colour reversion) of soybean salad oil. Almost all the precursors (such as tocored) were converted to colour-reverted substances under catalysis after bleaching treatment, and they were converted back to the precursors during deodourization. Those precursors might be gradually reconverted into the colour reverted substances during storage to cause the colour reversion in soybean salad oil. AS

2984 Proctor (A) and Snyder (HE). Regeneration of silicic acid following adsorption of soybean oil pigments. Journal of the American Oil Chemists" Society 66(4); 1989; 593-594

The effectiveness of sequential washes (isopropanol/hexane) of increasing polarity for desorbing soybean oil pigment (lutein) from silica was studied. Increasing the polarity promoted desorption of pigment, as the amount of adsorbed pigment increased. The evidence suggests that silicic acid has adsorption sites of variable accessibility. Lutein adsorption isotherms show that much of the adsorption capacity was regained after desorption. AS

Sunflower oils

2985 Chulu (CL), Barlow (P) and Hole (M). Cloudiness in Zambian sunflower oil. Effect of storage temperature and wax levels. Tropical Science 29(1); 1989; 33-38

Depending on the wax content, an increase in temp. over the range 0-25 C increases the clouding rate of refined, unwinterized, Zambian sunflower oil. For 200 p.p.m. wax, cloudiness appeared after 5 days at 5 C but after 1-2 days at 25 C, 10 C, or 0 C. At 100 p.p.m. wax, the storage periods were 12 and 4 days at 25 C and 0 C, resp. but were shorter (6 days) at 10 C than at 5 C (7 days). At lower wax levels, the storage period increased as the temp. was raised. A wax content of about 75 p.p.m. is the max. if formation of objectionable cloudiness is to be avoided for a min. of 3 wks storage at Zambian temp. This contrasts with the value of 150 p.p.m. obtained from the 24 h cold test. AS

SPICES AND CONDIMENTS

2986 Verghese (J). Indian curry leaf. Perfumer & Flavorist 14(3); 1989; 69-70

Essential oils

2987 Akgul (A) and Kivanc (M). Sensitivity of four foodborne moulds to essential oils from Turkish spices, herbs and citrus peel. Journal of the Science of Food and Agriculture 47(1); 1989; 129-132

The antifungal effect of 22 essential oils from Turkish spices, herbs and citrus peel on four foodborne moulds were evaluated for fungistatic acid fungicidal activity. The most active oils were wild thyme (Thymus rariflorus L) and thyme (Thymus serpyllum L). Parsley (Penloselinum sativum Hoffm) and savory (Satureja hortensis L) oils were found to be the least active oils. Rhizopus sp displayed the greatest tolerance, and the most sensitive mould was Penicillum chrysogenum. Prolonged incubations reduced the fungistatic and fungicidal effect of oils. It was concluded that some oils may be useful as mould inhibitors at food additives levels. AS

2988 Farag (RS), Badei (AZMA), Hewedi (FM) and El-Baroty (GSA). Antioxidant activity of some spice essential oils on linoleic acid oxidation in aqueous media. Journal of the American Oil Chemists" Society 66(6); 1989; 792-799

Some spice essential oils (caraway, clove, cumin, rosemary, sage and thyme) and their major constituents were added to emulsified linoleic acid in aqueous media to examine their antioxidant activity. The methods used for measuring linoleic acid oxidation were coupled oxidation of Beta-carotene, conjugated diene formation and thiobarbituric acid test. The essential oils under study possess an antioxidant effect and this phenomenon was increased by increasing their concn. Generally, the effectiveness of the various essential oils on linoleic acid oxidation was in the following descending order: caraway > sage > cumin > rosemary > thyme > clove. It appears that there was a relationship between the antioxidant effect and the chemical comp. of the oils. AS

2989 Lawrence (BM). Progress in essential oils. Perfumer & Flavorist 14(3); 1989; 71-80

Covers armoise oil, cade oil, melissa oil, pennyroyal oil, tea tree oil and ylang ylang oil. BV

2990 Lawrence (BM) and Reynolds (RJ). Progress in essential oils. Perfumer & Flavorist 14(2); 1989; 45-49, 52-54

Covers caraway oil, fennel oil and rosemary oil. BV

Citrus oils

2991 Buchel (JA). Flavouring with citrus oils. Perfumer & Flavorist 14(1); 1989; 22-26

Discusses citrus flavours application in soft drinks, confectionery and others. BV

Lemon oils

2992 Schieberle (P) and Grosch (W). Potent odourants resulting from the peroxidation of lemon oil. Zeitschrift fur Lebensmittel-Untersuchung und -Forschung 189(1); 1989; 26-31

The odourants of a lemon oil sample, which was peroxidized for 120 h at room temp. in the presence of light, were analyzed by an aroma extract dilution procedure. On the basis of their FD factors carvone, p-methylacetophenone, p-cresol, 4-acetyl-1-methyl-1-cyclohexene and 4 hydroperoxides were identified as the most intense odourants. Changes in the concn. of neral, geranial, linalool (odourants of the fresh lemon oil), carvone, p-methylacetophenone, p-cresol and p-cymene (dependent on the storage time) were determined and the odour units for these compounds were calculated. AS

Orange peel oils

2993 Baisier (W) and Reineccius (G). Spray drying of food flavours V. Factors influencing shelf-life of encapsulated orange peel oil. Perfumer & Flavorist 14(3); 1989; 48-53

The influence of trace pro-oxidants (Cu and Fe), surface oil, entrapped air and absolute density on the shelflife of spray dried single fold orange peel oil is studied. BV

Spices

Chillies

2994 Amrita Asthana , Kalpana Dixit , Tripathi (NN) and Dixit (SN). Efficacy of ocimum oil against fungi attacking chilli seed during storage. Tropical Science 29(1); 1989; 15-20

Seeds of chilli (Capsicum annuum L.), treated with the essential oil of Ocimum adscendens Willd., as well as with the synthetic fungicides Bavistin, Blitox-50 and Dithane M-45 , were stored in jute bags and tin containers for 12 months. The oil protected the seed completely from fungal development and was more efficacious than the synthetic fungicides. The oil did not show any adverse effect on seed germination and seedling growth of Capsicum annuum. AS

Garlic

2995 Ghannoum (MA). Studies on the anticondial mode of action of Allium sativum (Garlic). Journal of General Microbiology 134(11); 1988; 2917-2924

Pepper

2996 Udaya Sankar (K). Studies on the physico-chemical characteristics of volatile oil from pepper (Piper nigrum) extracted by supercritical carbon dioxide. Journal of the Science of Food and Agriculture 48(4); 1989; 483-493

In this study the extraction of pepper (Piper nigrum L.) using supercritical fluid carbon dioxide at various pressures and temp. has been carried out. The oil recovery under these conditions and the comp. of the oil obtained was compared to steam distilled oil. The effect of the extraction conditions on the quality of oil was also investigated. The volatile oil was analysed for it sp. gr., refractive index, and optical rotation. The samples were fractionated by column chromatography and both the samples and fractions were subjected to TLC, GLC and sensory analysis. The results showed that the pepper oil extracted by SCF at 10MPa and 60 C was superior to steam distilled oil. NGKR

SENSORY EVALUATION

2997 Eggert (J). Sensory strategy for success in the food industry. Journal of Sensory Studies 3(3); 1989; 161-167

This review discusses sensory strategy for success in the food industry. It covers sensory evaluation opportunities; developing a sensory strategy; the sensory professional; the business of sensory; gaining management support; sensory methodologies and sensory customers. NGKR

2998 O'Mahony (M) and Wong (S-Y). Time-intensity scaling with judges trained to use a calibrated scale. Adaptation, salty and umami tastes. Journal of Sensory Studies 3(3); 1989; 217-236

The Time-intensity scaling technique was modified for measurements of taste intensity. Instead of using the traditional procedure where intensities were estimated on the judges' own internalized scales, judges were trained to estimate concn. directly in millimolar concn. Such training was seen to increase precision, although the general shapes of the Time-intensity plots remained the same. The technique was applied to measurement of taste intensity change over time when NaCl or MSG stimuli were held in the mouth. Using this technique, it was possible to measure the relative effects, on taste intensity loss, of stimulus dilution by saliva and sensory adaption, the latter had the greater effect. Accordingly, the disruption of adaptation was found to be more important than increased salivation when chewing movements were made. AS

FOOD STORAGE

Nil

INFESTATION CONTROL AND PESTICIDES

2999 Spotts (RA) and Dobson (RL). Effects of the experimental fungicide RH 886 on Mucor piriformis. Pesticide Science 25(4); 1989; 391-399

No registered fungicide controls Mucor piriformis a cause of severe postharvest storage rot in pears, but the exp. fungicide RH 886 (active ingredients: 77% 5-chloro-2-2-methylisothiazol-3-(2H)-one and 23% 2-methylisothiazol-3-(2H)-one) has an ED_{50} of 23.1 μ gml in 5 min exposure for germination of sporangiospores of M. piriformis and an ED_{50} of 9.9. μ gml^{-1} for mycelial growth. Mixing RH 886 into infested, amended soil at 8 mg g^{-1} soil or mixing copper sulphate into soil at 1 mg g^{-1} soil prevented sporulation of M. piriformis. Application of RH 886 to pear fruits prior to inoculation, or immersion of fruits in solutions of RH 886 containing sporangiospores of M. piriformis significantly reduced fruit infection. AS

3000 Tigar (BJ) and Pinniger (DB). An assessment of methacrifos as a grain protectant and its efficacy against Oryzaephilus surinamensis L., Tribolium castaneum Herbst, Sitophilus granarius L.; Sitophilus oryzae L.; Acarus siro L., Glyeyphagus destructor Schrank and Tyrophagus longior Gervais. Pesticide Science 25(2); 1989; 175-185

A trial was carried out to investigate the efficacy of methacrifos against susceptible and multi-resistant strains of four sp. of insect and three sp. of mite. Methacrifos was applied to two separate 20-tonne loads of English wheat which were then stored under ambient conditions for 24 wks. The efficacy of methacrifos was assessed using established bioassay techniques which showed complete control for 24 wks of all susceptible insects except S. oryzae, where there were survivors at wk 24. Methacrifos also gave 100% mortality of resistant O. surinamensis for 24 wks. There was > 95% mortality for 16 wks of resistant strains of T. castaneum and of resistant S. granarius and S. oryzae for 20 wks. After S. granarius and S. oryzae were removed, the grain was incubated for 10 wks. Subsequent F emergence was considerably less from the treatments than from the controls. Methacrifos produced 100% mortality for T. longior for 24 wks, but control of G. destructor fluctuated and was < 100% at wk 24. There were survivors of A. siro from wk 4. AS

Pesticides

3001 Jitender Kumar), Gupta (PR) and Dogra (GS). Status of research on cross-resistance spectrum of resistant stored-product insect pests. Pesticides 23(3); 1989; 33-42

Pattern of cross-resistance of stored-product insect pests towards different classes of pesticides has been reviewed. The difference in the mechanism of resistance between storage pests and others is described. Spectrum of cross-resistance in stored-product insects investigated by various workers is presented in a tabular form. It is evident that in stored-product insects, intra- and inter-class resistance phenomena are also involved as found in other insects. Only insecticides at hand are fumigants (particularly phosphine) which have not still developed inter- or intra-class resistance and be employed to overcome the resistance shown by malathion, DDT and lindane. NGKK

Rodenticides

3002 Ram Singh and Saxena (Y). The susceptibility of house rat to some anticoagulant rodenticides. Pesticides 23(3); 1989; 27-28

New generation anticoagulant rodenticides Bromadiolone (0.005% and 0.0025%) Brodifacoum (0.0057% and 0.0025%) and Rodafarin `C' (0.025%) were tested using black rats. The former 2 were found to be effective and gave desirable mortality on a day's feeding. The difference between the poison bait intake and plain bait intake was insignificant showing that these rodenticides do not produce bait shyness. To avoid over killing of the rodent pest, the technique of pulse baiting is recommended. NGKK

BIOCHEMISTRY AND NUTRITION

3003 Livesey (G). Procedrue for calculating the digestible and metabolisable energy values of food components making a small contribution to dietary intake. Journal of the Science of Food and Agriculture 48(4); 1989; 475-481

Three procedures are described for the calculation of digestible or metabolisable energy values of food components making a small contribution to the diet in energy balance experiments. Each procedure is assessed for the extent to which measurement errors associated with energy balance studies are magnified when calculating these values. It is shown that one procedure used currently in the literature is subject to considerable error (for example 30-fold magnification errors for a component comprising ~5% of the food dry wt.) whereas others are very much less prone to errors of this kind. A new procedure is described which minimises the effects of experimental error. It is concluded that energy values of components contributing a small fraction of energy intake can be determined with greater accuracy by energy balance than is often considered possible. AS

Biochemistry

3004 Kennedy (JF), Noy (RJ), Stead (JA) and White (CA). A new rapid enzyme digestion method for predicting in vitro protein quality (PDD Index). Food Chemistry 32(4); 1989; 277-295

In this paper a new method has been reported for the estimation of protein quality of a wide var. of protein samples . This method is cheap, simple and applicable to various processed food products. The officially accepted PER assay has limited application for quality control and process monitoring due to 28 days required for the assay. Though many rapid methods like PDR, PPD, PPDD and C-PER were reported in literature since 20 yrs each has inherent limitations for use on an industrial basis. A rapid assay, the pepsin digest dialysate (PDD) index has been reported to determine protein quality over a wide range of protein sources currently available in human foods and this was found to be acceptable for use in food and nutritional product industries and for food and drug administration. NGKR

3005 Krinsky (NI). Carotenoids and cancer in animal models. Journal of Nutrition 119(1); 1989; 123-126

As evidence accumulated from epidemiological studies that Beta-carotene acts as chemopreventive agent with respect to inhibiting the appearance of certain types of tumors in humans, attention focused on animal models as a means of extending our understanding of carotenoid function. Unfortunately, most animals used in research are "white fat" animals, and require large amounts of carotenoids in their diets to obtain significant blood and tissue levels. Even with these limitations, Beta-carotene, a provitamin A carotenoid, as well as canthaxanthin, a non provitamin A carotenoid, have been shown to protect animals against UV-induced skin tumors, UV and carcinogen induced tumors, and carcinogen treatment alone. Similar observations have been made in cell and organ cultures where carotenoids have been shown to prevent malignant transformation and nuclear damage. Although the mechanism of this protection is still unclear, the evidence continues to accumulate that carotenoids may possess intrinsic chemopreventive action with respect to tumor formation. AS

3006 Luis (ES), Balagot (AH), Villaflor (AC), Sanchez (FC) and Develles (EN). Pb, Cd and Hg contents of bivalves collected during the different seasons of the year. Food Chemistry 32(4); 1989; 239-255

3007 Walsh (CJ), Thomas (RL) and Kunkel (ME). The use of metallic ultrafiltration membranes to assess calcium availability in vitro. Food Chemistry 32(4); 1989; 307-317

3008 Ziegler (RG), A review of epidemiological evidence that carotenoids reduce the risk of cancer. Journal of Nutrition 119(1); 1989; 116-122

The epidemiologic evidence that carotenoids are involved in cancer etiology is evaluated. Low intake of vegetables and fruits and carotenoids is consistently associated with an increased risk of lung cancer in both prospective and retrospective studies. In addition, low levels of serum or plasma Beta-carotene are consistently associated with the sebsequent development of lung cancer. The simplest explanation is the Beta-carotene is indeed protective. Since retinol is not related in a similar manner to lung cancer risk. Beta-carotene seems to play a role that does not require its conversion into vitamin A. However, the importance of other carotenoids, other constituents of vegetables and fruits, and other nutrients whose levels in the blood are partially correlated with those of Beta-carotene has not been adequately explored. In addition, smoking, a powerful risk factor for lung cancer, is associated with reduced intake of carotenoids and. lowered blood levels of Beta-carotene and has not always been adequately controlled in these analyses. Prospective and retrospective studies suggest that carotenoids may reduce the risk of certain other cancers; however, too few studies have looked at these sites to examine the consistency of the evidence. Although clinical trails of the efficacy of Beta-carotene in cancer prevention are underway, it is still necessary and prudent to continue well-designed prospective and retrospective studies of the carotenoid hypothesis. AS

Nutrition

3009 Miles (CW). Effects of vegetable proteins on iron and zinc adsorption and availability in human. Journal of the American Oil Chemists" Society 66(7); 1989; 924-931

This review discusses research on the effects of vegetable protein diets on Fe and Zn absorption and availability. Constituents of vegetables can have either a positive or negative effect on Fe absorption. Although the use of soy protein to extend beef patties was found to decrease nonheme Fe absorption in some studies, the use of soy-extended beef on a regular basis was not found to delecteriously affect the Fe status (serum ferritin levels) of adult men, mestruating females or school age subjects. Factors such as phytic acid level, dietary fiber content or protein source of vegetable protein diets have been implicated in decreasing the utilization of Fe and Zn by humans. The effect of the molar ratio of phytate on the Zn of the diet is controversial: some studies find a decrease in Znnc absorption with an increase in the phytate to zinc molar ratio; other studies find Zn absorption more dependent on the total amount of Zn in the meal than on the presence of phytic acid. Since many people meet their energy and protein requirements from vegetable sources, attention should be given to the mineral availability of these diets. AS

3010 Nagra (SA) and Khan (S). Vitamin A (Beta-carotene) losses in Pakistani cooking. Journal of the Science of Food and Agriculture 46(2); 1989; 249-251

The vitamin A content (as Beta-carotene) of 17 var. of local vegetables was estimated before and after cooking for 60 min. The loss of vitamin A in cooking ranged from 10 to 59% for different vegetables (mean 35%) UJSPR

TOXICOLOGY

Nil

FOOD LAWS AND REGULATIONS

Nil